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Grants and Contracts Report

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The National Estimates of Nonacute Hospital Utilization for 1981 presents national baseline estimates of inappropriate utilization in acute hospitals prior to the implementation of the Medicare prospective payment system. A total of 1,925,000 or 5.7 percent of adult admissions and 12 percent of associated hospital days were nonacute. Of the nonacute days identified, 4.2 percent were innappropriate because the admission itself was inappropriate. Another 7.8 percent of nonacute days occurred in stays where the admission itself was justified. These estimates were based on a probability sample of 5,732 admissions and 24,051 days of care from 253 hospitals in 40 States for adult patients discharged in 1981. The Standardized Medreview Instrument (SMI)—a medical utilization review tool for assessing the appropriateness of an admission and a day of care within the stay—was developed for use in this study.

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Health Care Financing

Grants and Contracts Report

Consumer Choice and Cost Containment: SAFECO's United Healthcare Plan

U.S. Department of Health and Human Services
Health Care Financing Administration
Office of Research and Demonstrations
Baltimore, Maryland
September 1984

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CHAPTER I

INTRODUCTION*

Many studies have documented that the manner in which health services delivery is organized and financed affects the use of available resources by both providers and consumers. Much of the debate in the literature centers around the superiority of some forms of organization, such as prepaid group practice plans (Klarman, 1963; Donabedian, 1965, 1969; Luft, 1978, 1980), and the cost containment achieved by various types of cost-sharing by patients, such as deductibles and coinsurance (Newhouse et al., 1981). Most recently, attention has been directed toward the potential for natural regulation of the health care market through competition among integrated health care plans (Enthoven, 1981). However, the growth and development of alternatives to traditional service benefit and indemnity underwriting have been uneven, and careful evaluation of major underlying implementation issues has been quite limited. This report addresses several of these issues.

Specifically, this study focused on comparisons among three health care plans offered to Washington State employees: Blue Cross of Washington and Alaska (BC), Group Health Cooperative of Puget Sound (GHC) and United Healthcare (UHC).**

At the time of the study, 1978 and 1979, BC was a comprehensive fee-for-service health care plan offering coverage for both hospital services and ambulatory services of a range of providers*** practicing alone and in groups. Some of these providers billed BC directly for the patient care rendered, while others billed the patients, who in turn were reimbursed by the plan. The BC plan coverage for state employees had a $50 per person deductible and 10 percent coinsurance feature, up to $2,000 per person.****

GHC was a large, well-established, consumer-owned, closed-panel prepaid group practice plan with salaried providers. A distinctive attribute of GHC was the assignment of a primary care physician for each member of the plan. The GHC plan provided first-dollar coverage for most services.

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*Diane P. Martin and Karen A. Hegtvedt

**In certain other areas of the state, other prepaid group practices were also available as options, but they are not included in this study.

***Providers included, among others, physicians, dentists, chiropractors, naturopaths. See Chapter II for details.

****Details of benefits and administrative procedures of each plan are presented in Chapter II.

UHC, a subsidiary of the SAFECO Insurance Company, was a fully prepaid, individual practice plan which placed primary care physicians (PCPs) at risk for their own services and the management of patient care more generally. Recruitment of large numbers of PCPs within selected communities in the State of Washington was accomplished in the period 1976-1978. In July 1978, the plan was adopted as a third option by the State Employees Insurance Board which has responsibility for the health benefits of 60,000 employees and their families. Benefits were similar to those of GHC.

UHC had several innovative features. First, the entire health care delivery system was organized around the PCP in fee-for-service practice. Family practitioners, internists, pediatricians and some obstetrician/gynecologists, all of whom provided entry-level or primary care, were eligible for participation in the plan. The PCP was responsible for the management of all care provided to an enrollee, that is, the PCP provided basic care and was expected to control specialty and ancillary service referrals, emergency room visits, and hospitalization.

Second, the PCP was the financial manager of health services provided to an enrollee. A prepaid sum was placed in an account to cover services rendered and referred by the physician; the amount deposited was based on the age and sex of enrolled patients. Generally, the PCP was reimbursed on a fee-for-service basis from the account. The physician was at risk for up to 10 percent of his or her fee for deficits or surpluses in the account (see Chapter III). Thus, the plan provided an incentive to the PCP to manage patient care in an efficient manner thereby avoiding an account deficit.

The third innovative feature of UHC was the subscriber's role. All enrollees had to select a PCP from those who had contracted with the plan, and they were required to obtain the approval of the PCP for all care received; payment for services used without prior approval could be denied by the PCP or the plan.

At this moment national health care policy, the evaluation of a plan like UHC that draws on the existing voluntary health care delivery system, induces more controlled delivery patterns and imposes physician risk-sharing has obvious importance. There are a number of issues pertaining to its implementation and effectiveness _vis a vis_ more traditional plans. These include success in obtaining agreements with physicians, the perceived impact of risk-sharing on the part of physicians, the effects of practice penetration, the reasons for choice of this type of plan by consumers, the degree of differential selection by degree of risk (that is, adverse or favorable selection into the plan), and, finally, the actual differences that obtain when comparing services used and claims paid under this arrangement to other alternatives.

The introduction of UHC as an option in a setting where the population was already covered by two more traditional health care plans offered a unique opportunity to address many of these issues. A multifaceted study was begun shortly after the first open enrollment period in which state employees were given the opportunity to change plans with UHC as a choice. There were four basic components of the project:

1. To determine physicians' reasons for their actions and to assess the perceived consequence of joining UHC on their professional practice, interviews were conducted with physicians who elected to participate in UHC, as well as those who declined the opportunity.

2. To determine the relative importance of factors affecting choice of plan, interviews were held with samples of families formerly covered by BC or GHC that switched to UHC, and those that remained with the established plans.

3. To determine the influence of health care plan characteristics, information was obtained on comparative services use and expenditures before and after the 1978 open enrollment period for samples of switchers and nonswitchers. Household interviews, calendar/diaries, claim files (for BC and UHC), and medical records (for GHC) supplied these data.

4. Families electing UHC during the second open enrollment period (1979) were randomly assigned to one of two plans with equivalent benefits: the existing plan arrangement demanding PCP coordination and approval for referrals, or an alternative arrangement which more closely resembled the traditional indemnity health insurance system (i.e., free choice of provider without any control of access by the PCP). Comparative use of services in the two groups provided an estimate of the cost-saving potential for controlled access and risk-sharing by the PCP.

In concert, the four components provide a sweeping portrait of the relative influence of consumer and provider characteristics as well as organizational arrangements on use and costs of health services in a single geographic area. It is the first time a study of this nature and complexity has been conducted. The specific objectives, methods and results of each component are presented in separate chapters.

In general, this report follows the chronological order of the study itself. Chapter II presents a description of the plans and benefits available to state employees in King County. Chapter III details the history of UHC. The characteristics of physicians joining UHC and their reasons for doing so are set forth in Chapter IV. Factors affecting choice of plan by consumers are presented in Chapter V; Chapter VI examines the comparative use and costs of services under the three plans. The design and results of the randomized gatekeeper experiment follow in Chapter VII. And, finally, the findings of the various components of the study are synthesized in reference to policy implications in Chapter VIII. Methods notes, source tables and data collection instruments are placed in the appendices which may be obtained through the National Technical Information Service, PB82 264920 and PB82 264938.

CHAPTER II

HEALTH CARE PLANS FOR WASHINGTON STATE EMPLOYEES IN KING COUNTY*

INTRODUCTION

The Consumer Choice and Cost Containment Study focused mainly on health care plans available to state employees who resided in or near King County (which includes Seattle) from January 1978 to December 1979.** These plans are: Blue Cross of Washington and Alaska (BC), Group Health Cooperative of Puget Sound (GHC) and United Healthcare (UHC). Until 1978 state employees in King County were only offered a choice between BC (or a similar plan) and GHC. In 1978 the state also contracted with UHC. Although these plans are organizationally distinct, the benefits each provides are comparable. State contracting and administration of the plans as well as plan benefits and limitations from 1975 to 1981 are discussed below. Administrative and plan characteristics during the study period are emphasized.

STATE COORDINATION OF HEALTH CARE PLANS

Coordination of health care plans is part of the state's responsibility to provide various types of insurance for its employees. The administrative body, the process of determining which plans will be offered, the plans offered to King County state employees and plan premiums are described here.

The State Employees Insurance Board

Various types of insurance offered to Washington State employees are coordinated by the State Employees Insurance Board (SEIB). This body was established by the state legislature to design and provide health care, life, liability, income protection and accidental death and dismemberment (AD & D) plans for state and higher education employees. Representatives from the executive and legislative branches of state government, higher education, a union, an association certified to represent other bargaining units of employees, a retired employee representative and the Director of the State Department of Personnel comprise the Board.

---

*Karen A. Hegtvedt, Diane P. Martin and William C. Richardson
**The sample for the choice of plan and comparative use of health care services components of the study is described in Chapters V and VI, respectively. The participants in the randomized experiment are described in Chapter VII.

Determination of Plans Offered to State Employees

Various health care plans have been offered to Washington State employees including higher education employees since 1975. Availability of plans depends on the requirements of the law and the competitive bidding process by which SEIB determines which plans it will offer in any given year. By law, if a health maintenance organization (HMO) is available in an area, employees must be offered a choice between a traditional plan and an HMO.

The traditional comprehensive, fee-for-service plan is offered statewide as the uniform medical plan which includes a modest deductible and a coinsurance feature. According to a set payment formula, after the deductible is satisfied, the plan pays 90 percent of covered medical expenses until a certain sum is reached and then pays 100 percent of those expenses; during the study period a 10 percent coinsurance feature was in effect until $2,000 in medical expenses were incurred.* Thus, the plan and the subscriber were copayors of expenses incurred beyond the deductible, over "usual and customary rate" (UCR) payments to providers and below $2,000. Nearly all benefits under the uniform plan are paid under this type of formula. It should be noted that UCR payments were high enough to constitute payment-in-full in most cases.

The SEIB designs a basic benefit package for the uniform plan within the financial constraints imposed by a per-employee appropriation. The Board distributes bid specifications which detail the benefits package, additional desired benefits and the bidding process, and invites bids from all insurance carriers and health care contractors who are licensed in Washington. Generally, the lowest qualified bidder is selected. However, the SEIB seems to prefer an established relationship with a carrier as a general strategy.

The state contracts with HMOs according to geographic considerations to fulfill its legal obligations. Typically, the state benefits package corresponds to the fixed coverage of the HMOs; some modifications in the HMO package may be requested to keep costs across the plans equivalent. During the study period, the state paid premiums up to the cost of the uniform medical plan only. However, with SEIB approval, the HMO could introduce a payroll deduction or copayment features if the composite premium was higher than that of the uniform plan.

As shown in Table II-1, during 1975 and 1976, the uniform medical plan for employees was provided by Washington Physicians Service Plan I (WPS I). A variant of this plan (which included BC participation) was presented as Plan II

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*The uniform medical plan payment formula is presented in more detail in Table II-4 and is discussed below.

TABLE II-1
HEALTH CARE PLANS OFFERED TO WASHINGTON STATE EMPLOYEES IN KING COUNTY, 1975-1981

	Year				
Plans	1975	1976	1977	1978-79	1980-81
Washington Physicians Service I	X	X			
Washington Physicians Service II	X	X*			
Blue Cross of Washington & Alaska		X*	X	X	X
Group Health Cooperative of Puget Sound	X	X	X	X	X
United Healthcare				X	X

*Joint BC/WPS plan.

(WPS II). From 1977 to the present, BC alone has underwritten the uniform medical plan.

The standard alternatives to the uniform medical plan are HMOs. There are two general types of HMOs: the prepaid group practice (PGP) and the independent practice association (IPA).* PCP physicians and staff receive salaries and the plans generally own their own hospitals and clinics. The centralized PCP contrasts with the decentralized IPA in which plans contract with physicians and facilities to ensure provision of services. IPA physicians maintain their individual practices and the plan reimburses them on a fee-for-service basis for services rendered. During the study period in King County, GHC and UHC were offered to state employees as a PCP plan and a modified IPA network plan, respectively. Table II-1 shows that GHC has been offered at least since 1975 while UHC is a relatively new alternative.**

Plans Offered to State Employees in King County

Due to the geographical availability of HMO plans, not all state employees have a choice among the uniform plan, a PGP and IPA. During the study period, the uniform plan, a PGP plan and a variant of the standard IPA plan were available in King County; their service areas are described in Table II-2.

As described briefly in Chapter I, BC is a fee-for-service health care plan which, unlike BC plans outside of the Western states offers coverage for non-hospital (e.g., physician, outpatient, drug, dental) as well as hospital services. Many health care providers, including specialists, bill BC directly; participation requires very little from health care providers, but for most subscribers, non-hospital coverage is of the indemnity sort. Regardless of payment mechanism, the BC enrollee has virtually total freedom in choice of health care providers and referrals. Health care facilities contract with BC and an enrollee choosing to use services at a participating hospital receives a service benefit. Care received at non-participating facilities follows the indemnity approach. Providers and facilities are paid by the plan and the enrollee as dictated by the payment formula on a fee-for-service or charges basis.

In contrast, GHC does not operate as a payment system nor do GHC enrollees choose from any physician or facility in an

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*SEIB refers to HMOs and Panel Medicine Plans (PMPs). The former correspond to PGPs and the latter to IPAs. Although our terminology differs from that of the SEIB, it is consistent with that used often in the literature on health services use.

**GHC has, in fact, been available to most state employees residing in its service area for many years, predating consolidation of employee benefits under SEIB's jurisdiction.

TABLE II-2

SERVICE AREAS OF HEALTH CARE PLANS OFFERED TO STATE EMPLOYEES IN KING COUNTY, 1978-79

Plan	Areas
Blue Cross of Washington and Alaska	Entire state
Group Health Cooperative of Puget Sound	Snohomish, King and Thurston Counties; City of Chehalis; parts of Lewis, Grays Harbor and Mason Counties within a 25 mile radius of Group Health facilities in Olympia
United Healthcare	King, Spokane, Whatcom, Snohomish, Skagit, Pierce and Lincoln Counties*

*Expansion in Snohomish County occurred in 1979.

area. Instead, the comprehensive care provided by this nonprofit, consumer-owned PGP is obtained at plan operated facilities from salaried plan health care providers. Under special circumstances (e.g., out of area emergencies, treatment unavailable at GHC), the plan approves and pays for services provided by non-GHC physicians and/or obtained at facilities not owned by GHC.

Some of the organization and operating characteristics of BC and GHC are combined in UHC.* Like GHC, UHC focuses on the provision of services rather than enrollee payment procedures for services obtained. Although modeling an IPA system, UHC is more appropriately described as a primary care network plan. Unlike the standard IPA model, the plan contracts only with primary care physicians (PCPs). Like BC, the enrollee is assured a wide choice of PCPs because UHC does not market the plan until 60 percent of the PCPs in an area agree to join the plan. Other operating characteristics are unique to UHC. As discussed in Chapter I, physicians joining UHC are the coordinators of an individual's health care and the managers of the cost of health care. A physician's participation in UHC carries with it many more obligations than does his or her relationship with BC. Although the UHC system provides a reasonable amount of freedom in an enrollee's selection of a PCP, the system contrains an individual's selection of other health care providers including specialists because all referrals must be approved by the person's PCP to be reimbursed by the plan. Similarly, the plan regulates use of facilities through the required approval of the PCP. In out-of-area emergencies, PCP approval may be retrospective. Thus, theoretically, the UHC enrollee initially has freedom in choosing a PCP and later this freedom is constrained by the UHC system in use of physician services and facilities.

Contrasting the plans, only BC is a plan in which providers are not at risk; GHC is a prepaid group practice and UHC is a primary care network plan. BC, due to its extensive service area and payment system, hardly contrains use of physician's services whereas UHC enrollees, after freely choosing from an open but limited panel of PCPs, are limited to services and referrals approved by the PCP, and GHC enrollees are limited to plan staff except under special circumstances. The plans are similarly ordered with regard to freedom to use health care facilities: BC enrollees may use any participating facility, UHC enrollees are subject to restrictions imposed by their PCP on choice of facilities and GHC enrollees customarily are limited to plan facilities.

In summary, the SEIB ensures that Washington State employees are offered a variety of health care plans. Varying in organizational characteristics, the plans available to King

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*More detail on the history and organization of UHC is provided in Chapter III.

County state employees during the study period were BC, GHC and UHC. The Board further ensures that plans provide similar benefits for a standard premium payment. Variation in responsibility for the payment of premiums and establishment of an acceptable premium level for the uniform medical plan are specified below.

Premium Payments

Before July 1977, the state contributed $35 per month toward payment of the premiums for any type of insurance (e.g., health care, life, disability) that the employee chose to purchase. The first $1.50 of the employer contribution was applied to the basic $5000 life and AD & D insurance. The employee determined the distribution of the remaining amount across insurance types for him or herself and dependents. Premium costs in excess of the remaining $33.50 were paid by the employee through payroll deductions.

In July 1977, the state assumed responsibility for the entire premium cost of medical and dental plans for the subcriber and his or her dependents. At that time, persons not enrolled in any SEIB health care plan were automatically covered by the uniform medical plan (BC) unless they opted for another plan. The state is not obligated to pay the full HMO premium if it is in excess of the uniform medical plan premium. If an HMO premium is higher than the amount it receives from the state, the HMO may reduce (discretionary) benefits or require the employee to make up the difference, subject to SEIB approval.*

Premiums of the SEIB fee-for-service plans are established on the basis of claims experience. Thus the ultimate cost of the plan is dependent upon past experience regarding use of services and costs. Premium costs for health care plans offered in King County to state employees since 1977 are presented in Table II-3. Until 1979, the premium for the uniform medical plan was consistently, though perhaps not significantly, higher than premiums for the other plans. Increases in GHC and UHC premiums to a level above the uniform plan premium are reflected in payroll deductions for GHC enrollees in 1979 and 1980 and for UHC subscribers in 1980.**

Thus, the SEIB coordination of health care plans provides that employees have a choice among plans and that plan premiums are generally paid in full by the state. More specific aspects of the state's role in administering the plans are discussed below.

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*HMOs have generally not reduced benefits as a means to bring the state payment in line with HMO costs.

**See note ## in Table II-3.

TABLE II-3

PREMIUM PAYMENTS FOR HEALTH CARE PLANS OFFERED TO WASHINGTON STATE EMPLOYEES IN KING COUNTY, BY PLAN AND YEAR, 1977-1981

Year*	Blue Cross	Group Health Cooperative	United Healthcare
July 1977 ($72.50)	$61.80	$54.10	--
July 1978 ($72.50)	61.80	61.80	$60.88
May 1979** ($85.00)	64.74	63.32	63.63
July 1979 ($85.00)	71.35	72.95#	71.35#
July 1980 ($95.00)	71.35	82.41##	82.13##
July 1981 ($121.00)	96.95	91.05	95.89

*Paranthetical amount below year indicates per employee legislative allotment for all types of insurance.

**Plan benefits and premiums changed to comply with new legislation which required the inclusion of maternity benefits in health care plans offered to certain employees.

#Due to changes in GHC premiums, a payroll deduction of $1.60 per subscriber unit was required. Both GHC and UHC SEIB paid premiums in this year were limited by a ceiling equal to the uniform plan (BC) premium of $71.35.

##Payroll deductions were required of GHC and UHC subscribers to meet new premium costs. Additional payments varied by subscriber unit characteristics and were as follows:

Plan	Payroll Deduction For Subscriber Only	Subscriber, Spouse	Subscriber Spouse, Children	Subscriber, Children
GHC	$3.00	$12.00	$20.00	$9.00
UHC	2.50	9.50	16.50	9.50

ADMINISTRATION OF THE PLANS

The SEIB is responsible for coordination of plan alternatives and dissemination of information. The Board publishes a bulletin providing an employee with general information on eligibility for state plans, enrollment procedures, specifics about each plan (e.g., areas of availability, benefits, limitations) and other administrative considerations. The bulletin provides the employee with full descriptions of the benefits of each plan in order that he or she can directly compare the plans and choose the one best suited for his or her needs. Administrative concerns are discussed here and plan benefits are described in detail in the following section.

Dissemination of Information

The SEIB distributes information regarding health care plans to the payroll or retirement offices of state agencies and higher education institutions. Then each disseminates the information to its employees. The SEIB attempts to ensure that employees have knowledge about state administration of plans and the operation and benefits of each plan; furthermore, employees are notified of changes in benefits offered by each plan.

State employees receive information on the health care plans when they are hired and prior to the yearly open enrollment period. The latter, generally held in May or June, is the period during which employees may change plans without evidence of insurability. The amount of information that employees receive prior to open enrollment has varied since 1975. Sometimes an updated version of the SEIB health care bulletin was not available for distribution; consequently, employees received summary descriptions of plan changes to be considered in conjunction with the bulletin from the previous year. Often few or only minor plan changes have occurred.*

Although the 1978 open enrollment period was one for which only a summary presentation was provided, thus limiting the comparison of all benefits across plans, employees received a full description of UHC and seemed well aware of the alternatives. The proportion of eligible families in the study who were aware of the open enrollment period was very high, well over 95 percent (see Table V-2 for more details). Among those who chose UHC, a vast majority had heard of UHC from their employer and were satisfied with the information they received. Thus, the manner in which information was disseminated prior to the 1978 open enrollment appears to have had no detrimental effect on employees' knowledge of the plans available to them.

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*Confirmation of this statement in terms of the modifications in plan health care benefits since 1975, can be found in Volume II, Appendix II.1.

The next year, 1979, employees received the complete SEIB bulletin which contained the detailed description of UHC benefits together with benefits provided by the other plans as well as notification of changes in plans prior to the open enrollment period. Employees who opted for UHC during this period were asked to participate in the SEIBUS randomized experiment.

In summary, the responsibility to disseminate information on state health care plans rests primarily with SEIB, which compiles the information and distributes it to the state agencies and institutions of higher education, and secondly to the appropriate agency or institution offices which distribute information to employees. As occurred in 1978, employees, however, do not always receive full information in a timely fashion; sometimes only summary information is available prior to an open enrollment period. However, lack of detailed descriptions does not appear to cause dissatisfaction among employees with the amount of knowledge about plans available.

Enrollment and Eligibility

Since the state assumed payment of premiums for health care plans, enrollment procedures have varied little. State employees enroll in the uniform medical plan or one of the plans offered in their area of residence. Employees who have not yet made a choice are automatically covered by the uniform plan.

Issues pertinent to enrollment include enrollment periods, choice of plans, employee eligibility, family member eligibility under each plan and eligibility after retirement. There have been few or only minor changes in the rules governing enrollment practices since 1975. These practices are specified below.

State employees enroll in the plan of their choice within 30 days after beginning work and both active and retired employees may change plans during open enrollment periods. An employee transferring out of an HMO area may change plans at the time he or she resumes work in the new area. Generally, plan coverage begins immediately; in some instances, however, enrollees are subject to plan restrictions regarding the treatment of pre-existing conditions.

An employee can enroll in only one state plan. In 1975, if both husband and wife were eligible state employees, each had to enroll separately and all children were enrolled under one parent. This rule changed in 1977 to allow dual insurance; that is, each enrolled separately and could list spouse as well as children as dependents covered by the plan.

Eligibility requirements remain virtually as they were in 1975. Persons eligible to enroll in a SEIB health care plan are: (1) full or part-time ($\geq$ 50 percent) state employees; (2) monthly salaried faculty and staff; (3) temporary employees whose employment extends beyond six months; (4) career seasonal employees; and (5) retired employees.

Persons ineligible for SEIB benefits include those whose employment is incidental to their education (e.g., teaching and research assistants in higher education) and temporary employees. Employees who voluntarily leave their jobs automatically become ineligible for a state plan.

Dependents are eligible for state coverage, but eligibility criteria vary among plans. Generally, spouses and children less than 19 years old are covered. Children 19 or older if they are full-time students (up to a certain age) or disabled prior to their 19th birthday or before the end of their student status are also considered part of the subscriber unit. There is variation in the age at which dependents are no longer covered or coverage is conditional. During the study period, unless a dependent was in school or disabled he or she was ineligible for coverage at age 19 under the uniform plan and under UHC, and at age 21 under GHC. UHC also specified that coverage of student dependents would terminate at age 23; the other plans did not limit duration of eligibility stemming from student status. In 1980, the uniform plan allowed for the inclusion of parents as dependents of an employee or spouse where the parent is defined as dependent for income tax purposes. New dependents are automatically eligible for coverage, subject to specific plan restrictions, but must be enrolled within 60 days or at open enrollment. If a dependent becomes ineligible for a plan, conversion to a new plan is possible during open enrollment (e.g., a subscriber switches from BC to GHC so that his or her 19 year old child who is not in school is covered for another year).

Only actively employed persons were included in the SEIBUS project, although the state specifies circumstances under which an employee may retain state coverage when he or she is not actively at work; this special eligibility refers to: (1) persons on leave without pay or laid off;* (2) seasonal employees between seasons; and (3) persons certified as disabled. Such persons assume responsibility for premium payments. There is no state contribution for those not actively employed but group premium rates apply.

Employees who retire are automatically eligible to continue coverage if they receive a monthly benefit from the retirement system. Retirees must notify the plan of their new status and assume responsibility for the payment of the premium. Also, there are special provisions for the coordination of Medicare and state plan benefits.

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*The number of months of special eligibility due to leave without pay has varied since 1975. Currently this status may be retained up to 24 months.

Because in some instances an inactive employee may retain state coverage by paying the premium, there are two categories of coverage: employer-paid and employee-paid. Benefits generally do not differ; however, the end of coverage under the SEIB plan varies by payment status. Employer-paid coverage, which applies to all respondents in the SEIBUS project, ends on the last day in which an employee is in pay status. Employee-paid coverage ceases at the end of the calendar month in which plan eligibility terminates.

If a subscriber becomes ineligible for state coverage, he or she retains only rights of conversion. Ex-employees may stay with a conversion plan at individual rather than group rates; generally, benefits are reduced and premiums are higher for individual contracts compared to group contracts.

Thus, the SEIB controls the organization of enrollment and disenrollment in plans and sets the criteria for general eligibility for coverage. Subject to SEIB approval, each plan then specifies eligibility for dependents.

Other Administrative Considerations

The SEIB bulletin or office and the payroll or insurance offices of state agencies and higher education institutions provide responses to questions employees frequently ask and direct them to the appropriate sources for specific inquiries (e.g., each plan educates its own enrollees regarding use of the plans). Some questions refer to SEIB practices that are, in effect, cost control measures such as coordination of benefits and the effects of third party liability. More specific information on the method of filing uniform medical plan claims and out of area service claims for GHC and UHC is also available. Those aspects important in determining the costs experienced by the plans are discussed below followed by a description of claims filing procedures.

Cost Control Measures

Coordination of benefits is a means of cost reduction. Persons who are covered by more than one plan such as the uniform medical plan can, potentially, collect more than the actual costs for the plan and, consequently, higher plan membership costs for everyone. To keep costs at a minimum, the state plan takes into account other coverage (including Medicare) in determining payment of services. The plan provides benefits in full or as a reduced amount that does not exceed 100 percent of the medical expenses when summed with payments provided by another plan.

Another cost-reducing provision is the SEIB plan's right of recovery of payments for costs incurred in treating an injury for which a third party is liable. If a subscriber makes a claim against the party responsible for an injury, benefits payable by the SEIB plan must be included in the claim and, when settled, the plan must be reimbursed for benefits provided. UHC also encourages its enrollees to submit claims for liability and even malpractice (when more than $300 is involved) to binding arbitration.

Claims Filing Procedures

The uniform plan claims procedures vary depending on the type of service rendered and have varied somewhat since 1975. Currently, for hospital services obtained in a Washington hospital participating in BC, the facility submits claims for the enrollee. The plan coordinates claims with their other state offices if a person is treated out of state in a hospital affiliated with the underwriter. For care at unaffiliated hospitals or those located outside of the United States, the enrollee submits the bill to the plan. The plan pays the hospital directly for its portion of the charges and informs the enrollee of the coinsurance payment due. For physician's services, the provider may submit bills directly to the plan on the "Provider's Service Billing Form," but generally few providers directly bill BC. Rather, the physician bills the enrollee, who submits the claim to the plan. The enrollee also is responsible for filing claims for prescription drugs, laboratory tests, radiographs, etc. The plan determines payment of claims according to the payment formula; usually the enrollee pays the full amount of the service and is later reimbursed by the plan.

Unlike the uniform plan, GHC and, to some degree, UHC are oriented toward the provision of health care services rather than the payment of claims for services. However, each has established a system by which an enrollee may be reimbursed for the cost of care received outside of their service area.

GHC and UHC have special provisions for emergency care outside of the service area. During the study period, for GHC enrollees, a coinsurance system was set up whereby the enrollee paid 10 percent or $25, whichever was greater, of the first $1,000 per episode and, for amounts over $1,000 per episode, the plan paid 80 percent and the enrollee 20 percent. Claims for reimbursement had to be filed within 60 days of being incurred at the GHC facility where the enrollee typically received care. Emergency out-of-area benefits applied during the first 120 days the enrollee was absent from the service area or during the ten months an enrollee was away at school. In contrast, UHC assumed full payment for out-of-area emergency services provided that the enrollee had no control over where treatment was received due to time or health constraints and notified his or her PCP within 24 hours after receiving emergency treatment or as soon as was reasonably possible. The constraints on out-of-area use of services appear stronger for GHC than UHC; such contraints may effectively control excess use and lower plan costs.

For care unavailable at GHC facilities or not provided by GHC physicians, the enrollee may be referred to care elsewhere. If plan approval is obtained for these non-GHC services, the plan pays the cost of the services; without plan approval, all expenses are incurred by the enrollee.* Similarly, for care received without the approval of a UHC enrollee's PCP, payment responsibility rests solely with the enrollee.

In summary, in addition to dissemination of information on eligibility and enrollment, the SEIB's responsibility extends to the explanation of provisions that are included to control plan costs and out-of-plan claims filing procedures, and most importantly, the benefits provided by each plan.

HEALTH CARE PLAN BENEFITS

Although plans and premium costs have changed over the years, the benefits package offered to employees has remained comparable over time and across plans. The payment formula for the uniform plan and benefits provided by the plans offered to King County state employees since 1975, with special emphasis on the provisions in effect during the study period, are described below.

Payment Formulas

The uniform medical plan payment formula defines benefits in terms of the subscribers' expenses for health care services. That is, the formula dictates the proportion of costs paid by the plan and by the subscriber. Under the payment formula, after the deductible is met for claims submitted, the enrollee is reimbursed by the plan at a percentage of reasonable charges for services.** The Major Medical Plan Formula (MMPF) and the Uniform Medical Plan Formula (UMPF) are titles given to the reimbursement formulas under the WPS plans and BC, respectively.

The variations in these formulas since 1975 are cited in Table II-4. Changes in the formulas which suggest an effort by SEIB to reduce the amount paid by the subscriber for health care services include the 10 percentage point increase in the

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*There is a 20-percent coinsurance of GHC enrollees for kidney dialysis which is approved by GHC physicians but not offered at GHC facilities.

**"Reasonable charges" refers to the typical charges for a service in a given area. It is much like the UCR though not necessarily the same.

TABLE II-4
REIMBURSEMENT FORMULA FOR THE UNIFORM MEDICAL PLAN[*]

Provisions	Plan						
	Washington Physicians Service I[a]		Washington Physicians Service IIb		Blue Cross[a]		
	1975	1976	1975	1976	1977	1978-79	1980-81
Deductible[c,d]	$50/person/year $150/family/year	* *	$100/person/year $300/family/year	* *	$50/person/year $150/family/year	* *	* *
Payment Formula (after deductible is satisfied)							
-physician services and/or other expenses	UCR for physician services; 80% of reasonable charges for other services up to $1950/year	*	UCR for physician services; 80% of reasonable charges for other services; up to $1950/year	80% of reasonable charges up to $2000/year	90% of UCR up to $2000/year	90% of UCR up to $1950/year	90% of UCR up to $1000/year[e]
-extension beyond deductible and payment specified above[f]	100% of reasonable charges up to lifetime maximum of $250,000	*	90% of reasonable charges up to lifetime maximum of $250,000	100% of reasonable charges up to lifetime maximum of $250,000	100% of reasonable charges for entire family up to lifetime maximum of $500,000	100% of UCR for for each member up to lifetime maximum of $500,000	*
Deviations from the Formula	---	Outpatient mental and nervous care[g]	---	Outpatient mental and nervous care	Outpatient mental care[h]	Outpatient mental care[i]	Outpatient mental care and vision care[i]
Special Conditions	---	---	---	---	Carry over credit if deductible or part of $2000 individual maximum is satisfied in last quarter of year	---	---

[*] An asterisk, "*", indicates that the information did not change from the previous year.

Notes to Table II-4

[a] Some benefits are paid at the usual and customary rate (UCR) and others are paid under the "uniform medical"--the reimbursement formula.

[b] In 1976, Washington Physicians Service and Blue Cross were joint underwriters for this plan.

[c] Excluded items are not counted toward the deductible.

[d] If two or more family members are injured in the same accident, one deductible applies to the expenses incurred as a result of that accident.

[e] This change was effective July 1, 1979. Also effective as of that date was the elimination of the ability to carry over the portion of the deductible satisfied in the last quarter to the next year (see special conditions).

[f] Up to $5000 of lifetime maximum is restored annually with evidence of insurability.

[g] Under the mental health provision 75 percent of outpatient mental health expenses are covered.

[h] Under the mental health provision, 50 percent of outpatient mental health expenses are covered up to $600 per year. See Volume II, Appendix II.1 for more details.

[i] Under the mental health provision, 50 percent of outpatient mental health care expenses are paid up to $1500 per year. Coverage for vision care is dependent upon type of treatment required. See Volume II, Appendix II.1 for more details.

percentage paid by the plan effective in 1977, the increase also in 1977 of the lifetime maximum from $250,000 to $500,000 and the 1980 provision that changed the individual maximum of $1,950 to $1,000 prior to 100 percent coverage. The Board's attempt to control plan costs for more discretionary types of care is reflected in reduced coverage for mental health care.* The larger deductible and lower rate of reimbursement in the WPS II plan compared to the other plans correspond to the plan's lower premium costs.

During the study period 1978-79, for most services the plan reimbursed the subscriber at 90 percent of expenses up to $1,950 and then at 100 percent. Coverage for mental health care services was reduced from substantially unlimited benefits; the plan reimbursed at a 50-percent rate and only up to $600 per year. Thus, while benefits across plans are comparable and premiums are paid by the state, the existence of the payment formula and other cost-sharing aspects, ensures that uniform plan subscribers inevitably incur out-of-pocket expenses if they use any services. In contrast, this is generally not the case in the other plans.

Plan Benefits

The benefits provided by the uniform medical plans (WPS and BC), GHC and UHC are presented in Volume II, Appendix II.1. During the study period, as well as currently, the comprehensive package of benefits for all plans addresses the following categories: (1) hospital room and board; (2) other hospital services; (3) hospital outpatient care; (4) emergency ambulance; (5) doctor visits; (6) outpatient diagnostic x-ray and laboratory procedures (7) surgery; (8) x-ray and radiation therapy; (9) maternity benefits; (10) prescription drugs; (11) orthopedic appliances; (12) blood and its derivatives; (13) care for mental and nervous conditions; (14) bone and eye bank charges; (15) special duty nursing; (16) physiotherapy; (17) eye refractions; (18) treatment for alcoholism;** (19) treatment for drug addiction; (20) congenital and pre-existing conditions; (21) supplemental accidental benefits; (22) skilled nursing facilities; (23) rehabilitation.

The SEIB package has been altered twice since 1975. In 1976, rehabilitation services were first offered, and, as of

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*The same logic does not apply to vision care for two reasons: (1) vision care is unlikely to be defined as discretionary and (2) eye care was not covered prior to 1980-81.

**Treatment of alcoholism is covered under the insurance board's health care programs because national statistics suggest that alcoholics tend to have other medical problems at a much higher rate than non-alcoholics. Treating alcoholism is viewed as treating the cause of additional illnesses and is, in the long run, expected to reduce costs by preventing those illnesses.

1979-1980, category (20), congenital and pre-existing conditions, was eliminated for BC and GHC and these provisions were specified under exclusions for UHC.

Plan organization is reflected in benefits provided. With emphasis on services, GHC covered services are provided in full and UHC services are paid in full unless obtained outside of the service area and/or without plan approval. Benefits of WPS and BC plans are described in terms of the amount of medical expenses paid by the plan (after satisfying the deductible). Generally, the UCR is paid for emergency ambulance, doctor visits and surgical procedures; if the UCR is greater than the actual charges, actual charges are paid. Other benefits, with the exception of those for mental health are covered by the standard payment formula, which, as discussed above, provides that the plan pay a percentage of the reasonable charges for the service.

Another major difference in coverage across plans is indirectly related to plan organization. The most striking difference between the uniform medical plan and the HMOs is the exclusion of coverage for preventive care under the former. The uniform plan does not provide payment for services such as immunization, routine well-baby care and physical exams. In contrast, such services may be obtained at GHC or from a UHC physician upon demand.* Similarly, eye refractions were not covered by the uniform medical plan until 1980-81, but were covered by the prepaid plans prior to that year. Eye examinations under GHC and UHC are provided if they are obtained from or recommended by a plan physician; there are additional charges for eyeglasses. GHC provides no services for contact lenses and UHC covers only the examination. New coverage under BC includes partial payment for the exam as well as lenses, frames and contact lenses.

A last distinction among plans is not related to plan organization. The uniform medical plan and UHC offer coverage for skilled nursing facilities. GHC provided such benefits to July 1, 1978.

Coverage for certain benefits has varied within plan since 1975. Although maternity benefits are currently provided in full by GHC and UHC plans and covered by the BC payment formula, copayments were required by the former in 1978-79 and a maximum plan payment was specified by BC from 1977 to 1979. Thus, maternity benefits were not provided or paid in full by any of the plans during the entire study period.

Coverage for mental health care underwent the most changes within the uniform plan and GHC over the years. Under

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*UHC requires a $25 copayment for elective adult physical exams.

WPS plans in 1975, the standard payment formula covered mental health care charges. For outpatient mental health services the percentage paid by WPS was reduced to 75 percent in 1976. Through BC, SEIB further reduced the percentage of plan paid charges for outpatient services to 50 percent and specified a dollar maximum to be paid for inpatient and outpatient mental health services. Since 1977, BC enrollees have been reimbursed according to the UMPF for inpatient treatment for mental health conditions and a 50-percent UCR for outpatient mental health care. The maximum for inpatient care has remained at $4,000 per year since 1977 but for outpatient mental health services the maximum paid (at the rate of 50-percent UCR charges) has increased from $600 per year during 1977-79 to $1,500 per year in 1980-81.

For GHC enrollees, the number of mental health visits fully provided has remained at ten since 1975 but the charge for additional visits has increased each year.* Also, in 1978-79, GHC deleted the additional $1,000 inpatient psychiatric benefit. Through 1980, the plan had no coverage for inpatient treatment of mental disorders.

Unlike the other plans, mental health coverage provided by UHC did not change during the study period. Inpatient mental health care was paid in full for a maximum of 30 days a year and up to ten outpatient mental health visits were fully paid under UHC.

In summary, the plans offered to Washington State employees provided similar benefits. The comprehensive benefits package covers a variety of goods and services. Some variations in the benefits provided reflect the organizational characteristics of the plan -- GHC and UHC provide benefits "in full" including preventive care whereas the uniform plan requires a low level of coinsurance for many services and excludes coverage for preventive care. During the study period, the plans were also differentiated on provisions for eye refractions and skilled nursing facilities. There were also within-plan variations in maternity benefits and coverage for mental health services during the study period. The differences across and within plans may contribute to understanding differential cost and use experience under each plan.

Plan Exclusions

Some exclusions and limitations follow from variations across plans while others are independent of plan organizational characteristics. There has been little variation in exclusions since 1975; exclusions discussed below pertain to the study period unless otherwise specified. Descriptions of the exclusions have been increasingly detailed.

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*See note q in Volume II, Appendix II.1.

Generally, BC, GHC and UHC do not provide the following: care for conditions covered by other forms of insurance (e.g., workmen's compensation, Medicare); dental care or cosmetic care unless required due to injury or for correction of congenital defect;* care for injuries resulting from war; treatment of conditions resulting from major disasters or epidemics, except as limited facilities and personnel can provide; and any form of experimental medicine such as procedures, devices and drugs not yet proven effective for a condition. The last exclusion was specified by GHC in 1978-79 and by UHC in 1980-81.

Other exclusions apply to some but not all of the plans. BC and GHC exclude treatment for sterility, impotence and frigidity (unless medically necessary to protect the health of the patient).** Payment for charges that would not usually be made or for procedures not specifically related to symptoms are excluded under BC and UHC. These two plans also do not pay for certain corrective devices (e.g., hearing aids) or therapies (e.g., special-purpose vision therapy). GHC and UHC exclude care not provided at plan facilities or approved by plan physicians.

There are some exclusions specific to each plan. BC does not cover preventive care, thus excluding routine well-baby care, circumcision, immunizations, routine physicals and treatment for exogenous obesity. The uniform plan also does not provide for custodial or convalescent care. Charges of PGPs are not paid by BC.

Some of the exclusions stated by GHC are rather specific, others are more general. Treatment for tuberculosis after diagnosis falls outside of the services provided by GHC. As of 1980-81, organ transplants (except kidney transplants) are also excluded. More generally, GHC does not provide drugs prescribed for excluded illnesses.

UHC sets one general limitation on preventive health care, requiring a $25 copayment for physicals necessary for employment, insurance or licensing. UHC also does not pay for services prohibited by law or regulation and house calls and/or emergency visits for non-emergency conditions.

In 1977, BC began to specify requirements for the payment of services. The plan would pay only for services certified as medically necessary by a physician for inpatient care received while under the constant care of a physician and for services obtained during the "normal" recovery period. Furthermore, in 1978-79, BC emphasized a preference that diagnostic and other tests be performed on an outpatient basis unless hospitalization is medically mandated. As is shown by BC policy and implicit in certain exclusions shared by all plans, the plans attempt to maintain some degree of control in payment or provision of services.

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*BC provides for general dental care under a separate contract as the SEIB dental plan for all employees. Such care is not provided under the BC health care plan.

**BC covered sterilization in 1977 only.

SUMMARY

As SEIB coordinates health care plans, employees have choices among comparable alternatives. However, organizational characteristics that distinguish the plans influence the few benefits which are not comparable across plans and may have an impact on an individual's use and cost of health care services.

In King County, three types of plans were available to state employees during 1978-79. The uniform medical plan, underwritten by BC, provides for payment of services according to a set formula in which the plan and enrollee are copayors. Enrollees may use services provided by any physician and participating facilities. In contrast, GHC provides services for its enrollees; except under special circumstances, the enrollee is limited to services provided by GHC physicians and facilities. UHC provides services through its network of PCPs and pays in full for services approved by a PCP. The UHC enrollee is subject to constraints on use of services imposed by the PCP. Thus, BC enrollees are the least and GHC enrollees the most contrained regarding choice of physicians and facilities. Both GHC and UHC exercise control over the amount and thus the cost of services rendered. In contrast, BC has little control over use of services or the amount of services provided by physicians and facilities.

The major difference in benefits across the plans reflect the plan's orientation to the provision of services. Preventive health care is covered by GHC and UHC but is excluded by BC. During the study period, other differences were provisions for skilled nursing facility services by BC and UHC and coverage for eye refractions by GHC and UHC. Of the three plans, UHC coverage is the most extensive, including that which is excluded in each of the other plans.

Considering plan organization and plan benefits, variation is expected in use of services and out-of-pocket expenses as well as plan costs. Even though the premium is paid by the state, the uniform plan payment formula ensures that the enrollee incurs some expenses if he or she uses any services. Out-of-pocket expenses should be minimal for GHC and UHC enrollees unless they choose to use non-emergent services outside the service area or from an unaffiliated provider without plan approval. To the extent that plan restraints on use of services are operational, plan costs are likely to be lower in GHC and UHC than BC. That the benefits provided by UHC are a bit more comprehensive than GHC, UHC plan costs may be higher than those of GHC.

Coverage of preventive health care may increase use of ambulatory services under GHC and UHC compared to BC. Also, use of preventive services may prevent illnesses which in the long run require more care and result in greater expenses. Thus, preventive care, especially in conjunction with constraints on use of physician and hospital services, may affect hospitalization rates. GHC and UHC rates are likely to be lower than those of BC.

Results of this project will establish whether these plan characteristics have an impact on use and costs of services as discussed above. Because UHC is new and in some ways unique, much of the study focuses on it. The UHC plan is examined in detail in the next chapter.

CHAPTER III

A HISTORY OF UNITED HEALTHCARE*

INTRODUCTION

This chapter provides a history of United Healthcare (UHC) from its conceptualization in 1969 through March 1980, including the period (1978 and 1979) when UHC was examined in the Consumer Choice and Cost Containment Study.

UHC was a prepaid primary care network plan organized in Washington State, Utah and California by the SAFECO Insurance Company. It combined the features of a prepaid comprehensive health plan with those of a traditional, fee-for-service independent practice organization of physicians. Its main feature was an expanded role for the primary care physician (PCP) in cost containment. The purpose of this chapter is to provide a narrative history of UHC and a detailed description of specific features of the plan.

A Brief Description of UHC

The UHC plan featured three innovations. The first was organization of the entire health care delivery system around the PCP. UHC contracted with general practitioners, family physicians, internists, pediatricians and some obstetrician/gynecologists who were in independent practice. They became the "general managers" for specialty care by referral, emergency department use and hospitalization. By design, self-referral by the patient was not covered by the plan unless it had been approved by the designated PCP.

The members of the specialties listed were included because they provide the largest share of first-contact and regular ongoing health care for adults and children. Although some internists and pediatricians develop specialized practices, many more define themselves as PCPs. UHC allowed the physician to designate whether he or she was a PCP.

At the time of enrollment, each member selected one physician from the list of participating PCPs, and was informed that he or she should obtain all care either from the physician personally or, upon the PCP's referral, from other specialists in the community. The PCP thus controlled all other medical care by the authority to deny payment for services if they were undertaken without authorization. When authorized by the responsible physician, the plan paid for all medical care, with no deductible or copayment, except for a $2 copayment by the member for each prescription and a $25 copayment for elective physical examinations initiated by the patient. The latter copayment was seldom collected by the doctor.

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*Stephen H. Moore and Diane P. Martin

The second innovative feature of the plan was that the PCP became the financial manager of the costs of care for his or her patients. Premium dollars were paid UHC by employers or employees through monthly payroll deductions. About 86 percent of premium funds were placed in the accounts of participating PCPs (to cite 1979 figures). The remaining 14 percent was withheld to pay for administering, marketing and reinsuring the plan. UHC was reinsured under a SAFECO policy in which the floating premium depended on total losses the previous year. Consequently the cost of reinsurance varied, but averaged about 5 percent of total premiums, or one third of the 14 percent overhead costs.

The amount of money placed in each physician's account, intended to cover the total costs of care if services were used efficiently, was calculated on the basis of the age and sex of subscribing members in the physician's panel of patients. Figure III-1 shows how the premium dollars were disbursed in 1979. The physician's account was divided in two parts; the first covered the services of the PCP and his or her office facilities; the second covered all other services obtained by referral (e.g., specialists', hospital and pharmacy services).

If there were fewer than 200 members in the physician's panel, then reimbursement for the PCP's services in his or her office and visits to the hospital were determined on a fee-for-service basis, paying 95 percent of each charge. According to the UHC design, if there were 200 or more members in the panel, the physician was paid a fixed monthly amount determined by the age and sex of patients in the panel and the scope of services provided in the office. Thus, when a physician had 200 or more patients enrolled in UHC, the PCP's care of UHC patients was prepaid at a fixed amount per capita, and this fund was set aside as a share of the PCP's account. However, when UHC was at its largest size only 37 (5 percent) of the 704 PCPs in California and Washington ever attained panels of 200 and converted to capitation.

The larger share of funds in the account was designated for services obtained with PCP approval outside his or her own practice. Because UHC had no contracts with specialists and hospitals, it paid them 100 percent of whatever they charged after the PCP reviewed and authorized the bill. The PCP received a monthly listing of all charges against the referral account and was required to approve payment before any check was written by UHC.

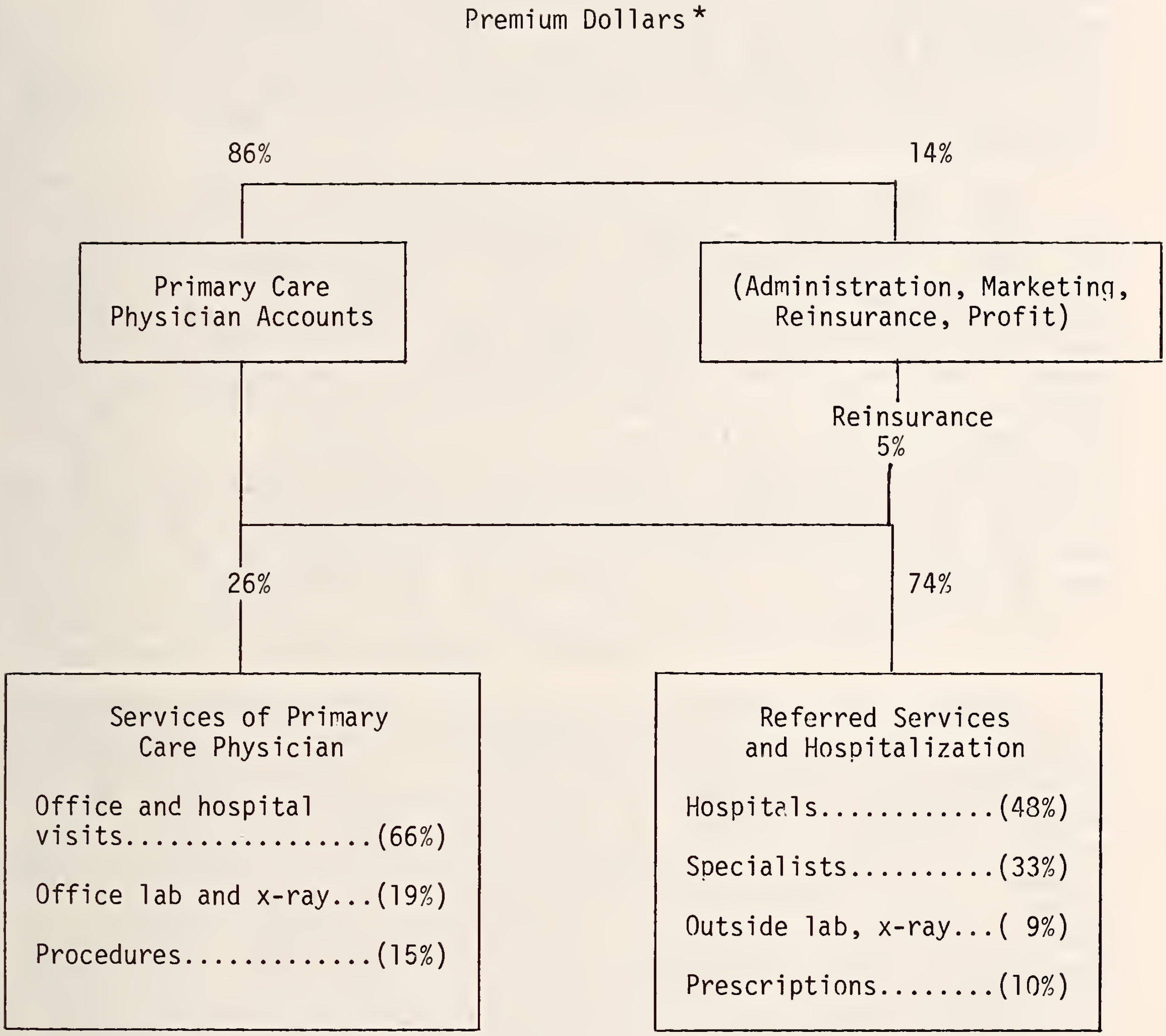
Premium Dollars*
86%
14%
Primary Care Physician Accounts
(Administration, Marketing, Reinsurance, Profit)
Reinsurance 5%
26%
74%
Services of Primary Care Physician
Office and hospital visits.................(66%)
Office lab and x-ray...(19%)
Procedures.............(15%)
Referred Services and Hospitalization
Hospitals............(48%)
Specialists..........(33%)
Outside lab, x-ray...(9%)
Prescriptions........(10%)

FIGURE III-1

CASH FLOW IN UNITED HEALTHCARE
(1979)

*Does not reflect actual losses.

The referral services accounted for three-quarters of the expenditures in PCP accounts during 1979. Hospitalization costs, referral care given by specialists, procedures, laboratory and radiographic tests done outside the PCP's office, emergency room treatment and prescriptions (any amount above the $2 copayment by the member) were all paid from this part of the account.

The third important feature of UHC was an incentive system to encourage the participating PCP to take seriously this new role as coordinator and financial manager for all subscribing patients' medical care. Briefly explained, this system required the participating physician to share in any deficit or surplus in his or her account at the end of each year. The physician shared 50 percent of the deficit or surplus with UHC, up to a maximum of 10 percent of his or her own fee-for-service revenues for UHC enrollees. In a panel of 200 or more patients where the PCP was paid a fixed sum per capita for his or her services, the PCP's maximum share of the surplus was increased from 10 to 50 percent of his or her fee-for-service revenue from UHC and the share of any deficit was decreased from 10 to 5 percent of that revenue.

HISTORY OF DEVELOPMENT THROUGH MARCH 1980

SAFECO is a property and casualty insurance company whose largest volume of business traditionally has been homeowners', automobile, title and life insurance. In 1969 executives at SAFECO became interested in entering the health insurance market for small groups. At that time most available information promoted the closed-panel health maintenance organization (HMO) as a means of containing future health care costs. In May 1971, after extensive review and several seminars on the subject, the Corporate Development Department decided that the closed-panel HMO model was not a good choice for SAFECO. First, it was too capital-intensive. Expansion to include a new market required million-dollar investments to build physical facilities. Second, the closed-panel HMO model could function only in large metropolitan areas where major employers might be convinced to offer the plan.

On the other hand, SAFECO had always preferred small group insurance and individual insurance markets in small towns and suburbs. Thus, even though the savings inherent in a closed-panel HMO were recognized, there was no inclination to enter that market. With the closed-panel HMO excluded as an avenue of future development, some innovation was required if SAFECO was going to develop a subsidiary in the HMO field.

SAFECO was convinced that the incentives offered to physicians were the reason for lower costs in closed-panel HMOs. The company already had developed a liaison with the Medical Group Managers Association, an association of administrators of small groups of physicians. Through this relationship, the opportunity to work with a group practice in Woodland, California, presented itself. UHC was created in 1975 and began operation in 1976. It was an opportunity to reorganize the financing of medical care so that some of the incentives that exist in a closed-panel HMO could be offered to physicians in an existing fee-for-service group. The liaison also provided the chance to experiment in the field without building the facilities required to start a bona fide closed-panel HMO. By contracting with an existing group practice, UHC could do the marketing, the administration and the risk-bearing for a comprehensive prepaid insurance plan. UHC's initial intent was to contract with an existing multispecialty group practice, not with any one group of PCPs within the group practice. At that time the Woodland Clinic had 52 physicians, 15 in primary care specialties, and was planning to expand the primary care staff.

Initially, the entire clinic had one large account from which all physicians' services were paid. The physicians as a group shared in any surplus or deficit in that account at the end of the year. The risk-sharing and incentives were never focused below that level to individual PCPs. In addition, political pressure from the clinic and a generous attitude by UHC caused the account to be increased each year to reflect 90 to 95 percent of fee-for-service charges.

While UHC had a positive experience in its joint venture with the Woodland Clinic, it was obvious to executives at SAFECO that there were not enough large, multispecialty group practices willing to form a joint venture with an insurance company to warrant limiting marketing to these practices. UHC executives became convinced that the PCP was in the best position to coordinate the rest of the medical delivery system. They believed that the PCPs, if given the correct incentives and responsibility, could coordinate their patients' use of the medical delivery system. UHC decided that when expanding to other areas it would not contract with specialists but rather work totally through PCPs. Furthermore, to promote financial accountability among individual physicians, the enrollment procedure would require members to choose one PCP through whom all care would be channeled.

Creating accounts for individual physicians, rather than groups of physicians, soon became a central feature of the plan. Early experience convinced UHC that allowing several physicians to share the same account diluted individual financial responsibility and accountability. There were several instances when the motivation and interest in efficiency of one physician in the group was offset by the inefficient behavior of another physician. As a result, UHC began to construct individual physician accounts even within the same group practice.

Along with the "account concept", another UHC concept adopted at this time advocated prepaying PCPs a fixed sum per patient for their own services when panels of patients were an appropriate size, initially set at 50, and later increased to 200. While the "account concept" would provide pressure for physicians to coordinate outside services efficiently, it would not encourage them to economize on their own office services in the most efficient way possible. If the physicians were to be paid a per-capita fee for their own office services, then there would be incentives to use less laboratory and radiography, to encourage patients to return only when necessary and to improve efficiency through the use of physicians' assistants or nurse practitioners.

After its first experience in Woodland, UHC began looking for a larger metropolitan area in which to try the concept. Because of the home office location, and largely because it would be easier to administer the plan without setting up another branch office, it was decided to try to start the plan in Seattle. The new location was accepted although the presence of Group Health Cooperative of Puget Sound (GHC) and the long history of widespread participation by employers in comprehensive insurance plans sponsored by physician groups presented a very competitive health care market.

In August 1975, the plan was initially marketed as Northwest Healthcare to physicians in selected suburbs of Seattle. The physicians eligible for marketing were those in general practice, family practice, pediatrics, internal medicine and obstetrics\gynecology who stated their practices provided mostly primary care. Within three months, approximately 40 physicians were under contract with UHC. When marketing to enrollees was attempted at several small businesses in the suburbs, it became apparent that physicians throughout the greater Seattle area were needed in order to interest employers enough to offer it as an option to their employees. UHC marketed its plan to 300 physicians throughout Seattle. By December 1976, about 15 months after it began, UHC had 200 physicians participating in the greater Seattle area. (King County had approximately 2,000 non-GHC practicing physicians, including specialists.)

By January 1977, UHC began marketing to employers in the metropolitan area. By the end of 1977 several small companies had offered the plan to employees, resulting in an enrollment of 2,300 employees in the Seattle area. By the end of 1979 enrollment reached 15,000, with 450 participating Seattle physicians.

Marketing to physicians in Spokane began in late 1977. It was known that the presence and recent growth of a closed-panel HMO in a community facilitates marketing to independent physicians because of widespread concern that the HMO would take away their patients. Spokane was such a city.

Marketing to physicians there was extremely successful. By March 1978, six months after starting, 110 physicians (almost 90 percent of all PCPs) had contracted with UHC. Marketing to employers in Spokane began in early 1978. A contract for state employees brought 600 new families (nearly 1,500 individual members) into the plan in Spokane during its first year of operation. Together with school districts and several smaller companies, total enrollment grew quickly in Spokane to 7,000 members by the end of 1979.

It is instructive to consider how UHC came to be offered to State of Washington employees. State employees became the largest employee group in UHC (almost 30 percent of all enrollees in Washington). In 1977 and early 1978, UHC had attempted to convince the Washington State Employees Insurance Board (SEIB) that UHC should be offered as a third option with Blue Cross of Washington and Alaska (BC) and GHC. SEIB believed that employees already had enough options. They felt there was no reason why they should take on the complications of administering another plan to state employees. However, a vocal group of state employees in Bellingham wanted the state to offer them the option of an HMO health plan; SEIB agreed to make UHC available if UHC would contract with Bellingham PCPs. UHC promptly recruited approximately 30 PCPs out of 40 in the community. In turn, SEIB made UHC available to state employees not only in Bellingham but to all state employees in Seattle and Spokane as well.

Marketing to physicians in the Bellingham area was quite easy because there was a threat that state employees would switch from any physician who didn't participate to take advantage of the comprehensive benefit package. Also there was a high level of physician dissatisfaction with the Blue Shield plan in the area. Blue Shield was paying PCPs less than it paid specialists for the same services and procedures. When UHC entered the market and offered to pay 95 percent of the physicians' charges, it was seen as a great improvement for PCPs. While there was no impending threat of an HMO stealing patients away from private physicians in Bellingham, these other two factors led to widespread acceptance of the UHC plan by the doctors, and fast growth of the new plan to 2,000 enrollees by the end of 1979.

DETAILED DESCRIPTION OF SPECIFIC FEATURES OF THE UHC SYSTEM

UHC's Relationship with PCPs

The most important single feature of the UHC system was the alliance with the PCPs. The effectiveness of the plan depended on the ability of the participating physicians to coordinate use of the medical care system in the most efficient manner. When considering with which physicians to make contracts, UHC had to reconcile two competing objectives.

To contain costs, it might contract with a carefully selected group of providers who have a reputation for high quality care, have a broad scope of practice, and are motivated and enthusiastic about coordinating the delivery system and lowering health care costs. To sell the plan to many employees, however, UHC would make contracts with as many PCPs as possible without any selection, because employees are more likely to change to the new UHC plan if they find their current physician among the list of participating physicians. UHC management decided to give more importance to marketing considerations and contract with as many primary care providers as possible, without any selection criteria.

Unlike other insurance plans, the most critical aspect of expansion for UHC was the initial marketing to PCPs in a new area. The process required the part-time services of a physician and between one and three non-physician representatives who presented a professional image. When representatives attempted to make an appointment with the physician, they were almost automatically put into the category of a "drug detail person." Initially, it was difficult for representatives to get appointments with physicians by simply calling at the front office. They usually were put off until a convenient time, when they could be seen as one of several "drug detail persons" within a one-hour period of time set aside by the physician. Later, with an advance mailing and the help of the medical director, the representatives could get through the front office and present the concept to the physicians in more detail. Approximately 60 percent of marketing presentations were to individual physicians, the rest to small groups of PCPs in practice together.

In some instances, there were strong barriers to getting any PCPs interested in UHC. In small, rural communities UHC frequently found a close-knit relationship between the PCPs and the specialists. In one such community, the plan was effectively boycotted. The specialists so strongly disliked the concept of being monitored by their primary care colleagues, that they negatively influenced one large employer's impression of the plan and convinced the primary care doctors not to join. The same situation did not develop in larger metropolitan areas where PCPs participated without the knowledge of the specialist community. Also, because enrollment was small relative to other insurance plans, little real threat was presented to the specialists. For instance, in metropolitan Seattle, with a population of 1.5 million, UHC enrollment was only 15,000 by early 1980, and most specialists had never heard of the plan.

The first physicians approached in the marketing effort in any new area were critical to the success of the plan. In both California and Utah, one group of high-quality physicians refused to participate because the list of physicians already included those whom they did not consider high-quality providers. The first physicians asked to participate must be the leaders of the medical community, well-respected by their colleagues. This frequently meant going to a large group practice generally acknowledged to deliver high-quality care in order to avoid being associated with only solo practitioners who might be seen as "low-quality providers."

During the initial presentation, the PCP was usually struck by several apparent disadvantages of the new concept. The first feature that many found objectionable was capitation for total costs of care. The doctors frequently stated that they had little or no control over many of the costs of medical care, and therefore did not think they should be at risk for hospitalization and services of specialists. They said these costs usually resulted from events which were beyond their control. These objections were countered by attempts to convince them that the level of their risk-sharing was limited to 10 percent of their fee-for-service charges on these patients. Thus the worst they could receive was 85 percent of their charges (95 percent initial reimbursement minus 10 percent) if there were a large deficit in the account. Even the 85 percent was better than they were receiving from most third parties which paid by fee schedule. This explanation of size of the incentive served to calm most objections but also tended to reinforce the notion that the plan offered a "no lose" situation for the average PCP. They were presented with a new coordinator role which put them in the "driver's seat" with a chance for a sizeable bonus or a very small financial penalty. The coordinator role is one that has been advocated in recent years. In 1966, for example, the so-called Millis report envisioned a substantial increase in PCPs to plan just such a role (Millis, 1966). UHC provided a mechanism to allow the PCP to be an effective coordinator. Balances were calculated in March for the preceding year, thus accounting for most incurred claims. A shortcoming of the system, however, was that during the year, the physician could not distinguish catastrophic care costs for which he was not responsible.

At the end of 1979, 52 percent of the physicians had surpluses in their accounts. The average physicians's share of surplus paid was $413; the highest amount was $5,007. For the 48 percent of the physicians who had deficits, the mean physicians's share was $160; the largest physician's share paid back to UHC was $1,833.

The second feature that rarely elicited any enthusiasm was "capitation for one's own office services." Physicians saw this goal of the plan as contrary to their own system of values. They wanted to be paid for services they rendered, and not paid if they did not see a patient during the year. This objection came most strongly from internists and pediatricians, who felt they took care of a more complex case mix of sicker patients than the family physician. These objections were usually answered by the explanation that capitation for their own services was dependent on what their fee-for-service charges were the year before. Billing records were kept and at the beginning of each year a negotiation for capitation rates was scheduled. Rates were to be adjusted according to fee-for-service charges of the previous year. UHC decided in 1979 to delay capitation until the number of patients in the physician's panel reached 200 (previously the conversion had been planned for panels of 50). The smaller number was found to be too small to set an accurate capitation figure for the individual physicians with whom it was tried.

Because, unlike some independent practice associations (IPAs), UHC always calculated the capitation rates to be close to the PCP's fee-for-service billing, the plan never used capitation as a means for achieving savings. The philosophy of UHC was not to save money on the PCP's services but to pay him or her well in exchange for efforts to monitor the referral and hospitalization side of the account. In 1979, 74 percent of the dollars in the PCP's accounts were spent on services other than primary care, (Figure III-1) and that percentage was increasing. Given the preponderance of non-PCP-generated charges, the conclusion was reached that there were few savings to be realized by putting PCPs on capitation for their own office services, especially with the existing capitation rate formula.

The third feature that negatively influenced the PCPs at first exposure was the requirement for their review and approval of all other physicians' and hospital bills paid by UHC. The physician saw this as a heavy administrative burden adding to the substantial time he or she spent with forms and paperwork. This objection was usually met by accurately quantifying the amount of work required. If the physician had 100 UHC patients, on the average there would be 100 bills from specialists, eight hospitalization bills, and ten emergency room bills to be reviewed during the entire year.

The fourth feature that PCPs resisted was monitoring their colleagues in specialty medicine. While they might agree that specialists are too "procedure-oriented" and charge too much for what they do, they had always deferred to specialists about the necessity to operate or do a procedure. They frequently were in no position to argue with colleagues who had more experience and training than themselves in specialty areas. They did not have the time or interest to educate themselves and question the specialist about the indications or costs of these procedures. Thus they agreed to be the gatekeepers, but did not want to coordinate and police the specialists.

Referral habits were difficult to influence. Physicians frequently had established referral patterns that depended more on long-term relationships, impressions of competence, convenience and personality of the specialist than on the costs of care rendered by that specialist. They were reluctant to change those referral patterns, even if presented with a list of other specialists who might be willing to do the same procedure on an outpatient basis for one-half the total cost. Any change to more cost-effective specialists could only occur in larger metropolitan areas where there was a choice of several specialists doing one procedure, and where the possibility existed for a spectrum of quality and price options. In smaller areas, PCPs had little choice in their referral patterns, and little opportunity to lower the cost of specialists' services or hospitalization.

The reluctance to monitor colleagues and change referral patterns also applied to hospitalization. The participating physician may have had hospital privileges at only one or two hospitals in the area, and was reluctant to change hospitalization patterns simply because rates charged by one hospital might be lower than another. The physician's patients also had preferences, and the doctor could not direct patients across town to a less expensive, more efficient hospital in order to minimize the cost of hospitalization.

A consideration influencing PCPs to participate was the threat of this plan to the physician's existing patient loads or ability to acquire new patients if they did not join. Many of the serious objections mentioned above melted away in the face of significant likelihood that the plan would be widely accepted by employees in the area. Only the most established practitioners with no need for new patients considered the potential success of this plan an unimportant consideration in deciding whether they wanted to participate in it. This was why, when UHC marketed the plan in new areas, it did best when it had commitments to offer the plan from several large employers.

In all areas except Bellingham (where the number of physicians was small and the growth in patients rapid), panel size grew slowly during the first four years. Figure III-2 indicates that in March 1980, when the plan had the highest number of enrollees, only 25 percent of the 704 participating physicians in Northern California, Seattle, Spokane and Bellingham had more than 50 patients in their panels and only 10 percent (70 physicians) had more than 100 patients.

UHC's Relationship with Specialists

There were two major considerations in the way the UHC plan related to specialists. First, it paid 100 percent of whatever charge the specialists made for a given procedure or consultation. This is not common among other insurance plans. In service plans such as Blue Cross and Blue Shield, it is customary to pay according to a fee schedule or profile. The

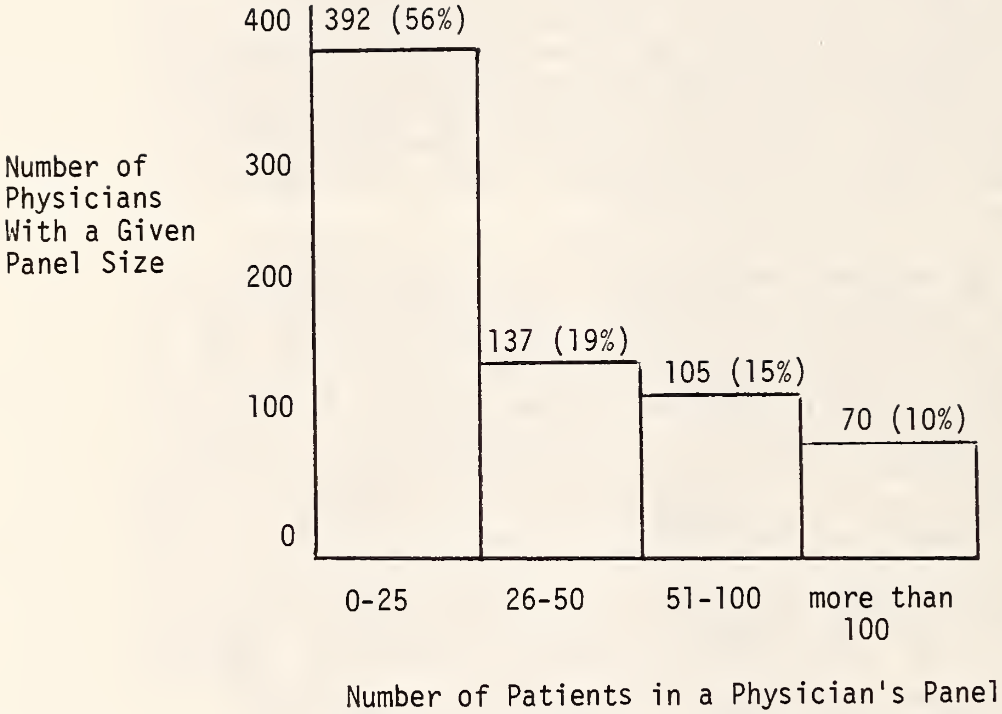

FIGURE III-2

NUMBER OF PATIENTS
IN A PHYSICIAN'S PANEL

Blue Shield profile for many doctors is less than their charge.

Secondly, the plan did not allow patients to refer themselves to specialists. If the patient wanted the specialist's bill paid, he or she had to have at least retrospective approval, if not prospective referral, from his or her designated PCP. Thus, the specialist became a "doctor's doctor," and second opinions were mandated by the requirement that a patient consult with the PCP before seeing a specialist. There was no strong reaction by specialists in large metropolitan areas to the concept of being monitored by their colleagues. Even in a city as over-supplied with specialists as Seattle, UHC was not recognized as a threat because of its low market penetration. When it entered smaller, more confined rural communities, it could be seen as an immediate threat to the existing system.

Initially UHC preferred to market to PCPs exclusively, and not to present the concept in large meetings including specialists, such as at medical staff meetings of a hospital or medical society meetings. UHC physician representatives met strong negative reactions from specialists in those situations, thus impeding the marketing to PCPs. The usual objections are characterized by the following two quotations:

> PCPs are often not qualified to judge when a given patient should see me.
>
> I think the best interest of both the patient and myself are served by allowing freedom for the patient to see me when he chooses. I am opposed to any system where this freedom is taken away and put in the hands of some insurance company or alliance of an insurance company with PCPs. This is no better than the government regulating our practice.

These objections by specialists represented a threat to the expansion of UHC and similar primary care network plans.

UHC's Relationship with Employers

The appeal of the UHC plan to employers was that it would eventually control the rising cost of health insurance premiums. They hoped to offer more health benefits to their employees for a lower premium. One potential advantage to the employer was that UHC used experience ratings. Usually this was an advantage only in groups with more than 100 employees where information was available from the employer regarding utilization experience in previous insurance plans. When the employer had fewer than 100 employees, frequently the actual utilization experience in the previous plans was not available and the age-sex profile was used instead of experience to quote a premium rate.

The experience rating was advantageous in renewal situations where premium rates could be lowered because of the low health care use by that group during the earlier years of enrollment in the plan. For instance, in 1980 at Swedish Hospital in Seattle, premium rates did not increase because of low use by members in 1979. Premiums increased between 10 and 20 percent for other large groups in the same area.

An important aspect of marketing to small- and medium-sized groups is that the transaction usually involves an insurance agent. The independent agent typically receives a commission from the insurance company. For HMOs it is 5 percent of the first $10,000 in annual premiums and 2 percent of the excess, up to $100,000 in annual premiums. By contrast, many indemnity plans pay the agent twice that in their commission structure. Thus, agents are more reluctant to sell the HMO benefit plans out of self-interest regardless of the employers' interest.

For larger employers, any new plan is at a disadvantage. The first requirement in large companies with sophisticated buyers is a long track record of trustworthy claims administration and payment, with sound financial reserves. Most larger companies buy their health insurance package through brokers. Frequently a broker is not even willing to consider a plan until it has been around for several years. Also, since the broker's income is dependent on the current premium, there is no incentive to introduce the employer to new plans which might eventually lower the overall costs of health insurance.

In marketing to large employee groups, the company's benefit package is frequently determined by a bargaining process between labor unions and management. Since UHC offered only the comprehensive HMO benefit package, with no copayments or deductibles, UHC frequently represented more comprehensive benefits than had been won by the unions at the bargaining table. Large companies with branches in more than one state also were not likely to offer a plan which was confined to Washington State, Utah and California. For example, the Boeing Company might have been more interested if the UHC plan were available in Wichita, Kansas, as well as Seattle.

UHC's Relationship with Employees

When this plan was marketed to a new group of employees, the educational effort required was different from that of other insurance plans. The prospective member had to understand the importance of choosing one PCP from the list of participating physicians and channelling all future medical care through that one physician. The individual's established relationships with specialists such as dermatologists, gynecologists, allergists and surgeons were initially jeopardized until the member could ascertain from his or her PCP whether referral would be allowed. In some cases, the patient was able to convince the designated physician that referral should continue as it did outside the UHC plan. In other instances, prospective members sensed that they might jeopardize the relationship with their specialists and would not join UHC for that reason.

Employees were influenced to a large extent by the share of premium they paid and the trade-offs they perceived between more comprehensive benefit packages and higher payroll deductions. The UHC plan was especially attractive to groups of public employees with richer benefit packages because a high percentage of the premium was usually paid by the employer. In this situation the UHC plan offered a more comprehensive benefit package with little additional cost to employees and, in most instances, members could continue with their existing PCPs.

Among other employees who only had a choice of indemnity plans, the UHC plan cost more because of greater benefits and anticipated higher use by enrollees who were sick enough to pay the higher premium contribution. Where there was already another reasonably comprehensive plan offered to employees, UHC in general was able to offer its plan for no more than 5- to 10- percent higher premiums. Although rates varied depending on age and sex compositions of each group of employees, an average monthly premium of an employee in the Seattle area during 1979 was $40 for an individual and $115 for a family.

In some instances a member would enroll with a PCP but then attempt to "test the system" by continuing to go to emergency rooms and specialists at will. UHC handled this problem by asking the physician to notify UHC when it occurred. First-time offenders received a letter describing how the plan works and warning that future bills would not be paid unless the patient was referred by the PCP. Second-time offenders received another letter denying payment of the claims, reiterating how the system worked, and offering to insure the patient under an indemnity plan. In only two instances was it necessary to negotiate with individual members about their abuse of the system. However, the administrators of the plan think that much abuse went unnoticed or unreported by the participating physicians.

Satisfaction with the plan was high among members after enrollment. One indication of this was the low number of people who switched from UHC to alternative coverage: among 1,518 Washington State employees' families, only 23 switched to an alternative plan during the open enrollment in 1979.

Informational and Educational Aids to Controlling Cost

Each month, a "medical group statement" was created for each PCP by the computer information system. This statement detailed how much money was put into his or her account and how much was paid out during each preceding month and for the "year to date." The physician was given subtotals of funds spent for office services and referral care. The physician knew from this statement how much was spent from his or her account on hospitalization, referral to medical specialists, referral to surgeons, and outside laboratory, radiology and pharmacy services. The statement was accompanied by a list of all patients in the physicians' panel during the preceding month, but costs incurred by individual patients were not reported unless the physician requested that information.

As aids to the cost control system, UHC published a monthly newsletter to all participating PCPs which featured articles such as "How Much Should You Be Paying Your Surgeon?" In that article, UHC published the average professional fee schedule for the ten most common surgical procedures for the largest service areas during 1979. The PCP was expected to use that information to judge whether bills coming from the specialists to whom he or she referred patients were more or less expensive than average for the area. The physician could also receive information (by request to UHC) on any individual specialist's fees.

UHC also developed a "referral form" for the PCP to use in sending patients to specialists. It specified the level and content of the consultation that the PCP expected. The form was meant to prevent specialists from repeating diagnostic tests and beginning treatment when the PCP needed only a consultative opinion. It was intended to prevent automatic referral by one specialist to another without consulting the PCP first. The form also served to notify the specialist that the bill should be sent to the PCP.

UHC did very little review of individual claims from 1976 to 1979. Every bill had to be reviewed by the PCP. Bills sent directly to UHC were forwarded to the PCP for approval before being paid. Specialists and hospitals were commonly paid whatever they billed, if the bill had the approval of the PCP. There was a great deal of dependence on PCPs to monitor costs, and the only denials of claims that occurred in the central office were for services not covered under the benefit package.

The information system was used on two occasions for quality of care review, looking for excessive use of drugs. A 1978 review found no recorded office use of chloramphenicol on claims submitted during a two and one half year period. In 1979, the system was used to review the number of Valium prescriptions being written by a specific group of physicians.

In summary, when the project began, the enrollment into UHC of Seattle physicians and a population of plan consumers had recently been accomplished, and the system was in full operation. During the study period, it was in effect undergoing its initial full-scale test of feasibility with the individual physician account concept in operation and with the PCP serving as the agent of health care cost containment. The following chapter reviews the reasons of PCPs for joining or not joining the plan and examines the impact of joining on the physicians' practices.

At the end of the study period, UHC management was recognizing aspects of the plan that permitted costs to rise rapidly. Those aspects, what UHC did to change them, and the events that supervened are the subject of an epilogue in Chapter VIII.

CHAPTER IV

PHYSICIAN PARTICIPATION IN UNITED HEALTHCARE*

INTRODUCTION

As we have seen in Chapter III, United Healthcare (UHC) marketed its approach in a very aggressive way to private physicians. The goal was to gain widespread participation of private physicians in order to successfully market to employees who did not wish to change existing physician relationships in order to join a new insurance plan.

The intent of one component of the Consumer Choice and Cost Containment Study was to examine the participation of physicians in this new network plan. The key to success for any independent practice association (IPA) lies with its ability to attract high-quality and cost-effective private physicians. One of the objectives of this project was to describe the type of physicians who joined UHC and to compare them to those who did not join, as well as to determine why the physicians had joined and to ascertain how the doctors who joined viewed the plan after two and a half years of participation in it. The study also attempted to probe physician perceptions of whether the important features of the plan were working properly and whether the plan had changed the behavior of any participating physicians. The study was not initiated until June 1979, which was on the average two and a half years after most of the physicians had been asked to participate. Thus, our findings must be interpreted in light of the fact that doctors were answering our questions about their participation in this network some two and a half years after they had made the decision to join or not join the plan.

BACKGROUND FOR PHYSICIAN PARTICIPATION

There were several features of this plan which were different than the traditional IPA. This was not a coalition of physicians organizing in order to retain patients in a competitive market. It was instead an effort initiated and directed by a large insurance company. The image of SAFECO was one of a conservative and profitable company which would not undertake a new endeavour without strong conviction of its ultimate success. Most physicians perceived the company as financially sound and well managed. However, many remained suspicious that SAFECO would eventually tell them how to practice medicine in order to create a profitable plan. Thus, the doctors were expected to be wary of joining a plan in which they had no control of or equity interest in the outcome.

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One way in which many IPAs control costs is to use pre-authorization of hospital admissions and concurrent utilization review in order to lower hospital costs. Such plans also depend on a fee schedule to provide them with a discount off the usual cost of physician services. In order to gain widespread participation by physicians, UHC initially used neither of these controls. While most physician-sponsored IPAs withheld part (typically 20 percent) of the physician's initial fee until the end of the year to determine if total costs would allow paying the remainder to member physicians, UHC proposed something quite different. The primary care physician (PCP) would receive 95 percent of whatever he or she charged (no fee schedule used) within one month of billing the plan. Then at the end of the year the physician would pay back to the plan up to 10 percent of his or her cumulated professional fees generated from plan patients if the total cost of health care had exceeded actuarily constructed limits. Alternatively, if total billed costs were less than actuarily predicted, the physician would receive a bonus of 50 percent of any surplus revenue. It was the first time in California or Washington that individual physicians had been given the role of gatekeepers and financial managers for the whole health care system. Thus, there were counterbalancing forces working to affect physician participation in this new plan. On the positive side, the reimbursement and financial controls were better than in most IPAs. However, the insurance company sponsorship and the new expectation to coordinate the rest of the delivery system were drawbacks to gaining widespread physician participation.

While most IPAs market to specialists as well as PCPs, UHC had no involvement in the specialist community. Only PCPs were sought as participants and there were major attempts to market the plan in small groups and individual offices rather than risk large meetings where specialists could provide active and visible resistance. However, the definition of PCP was very flexible and largely physician controlled. Internists, even those who practiced a subspeciality, and obstetrician/gynecologists were accepted if they wanted to join. There were also about 16 general surgeons who were accepted into the plan because they were doing largely primary care.

The marketing was initially done by non-physician representatives of the insurance company. Three were men in middle-management positions and one was a woman who had prior experience as a physician representative for Blue Shield in Seattle. There was no attempt to standardize the presentations given by these four persons. However, there was an emphasis on the new coordinator role for the PCP, the continued fee-for-service payment system and the physician's financial interest in the outcome of the costs for total patient care. During the initial marketing presentation the physician was told that after his or her UHC panel had grown to 50 patients, office and hospital charges would be switched from a fee-for-service reimbursement to a monthly capitation fee. This was explained as a means of facilitating the bookkeeping for both parties and not as a means of restricting primary care revenue. The emphasis was put instead on the physician's expected role in coordinating the remainder of the delivery system (specialty and hospital care).

After the initial 30 to 60 minute presentation, a physician contract was left in the office. University of Washington physicians and internists at a large multispecialty group practice were the only physicians excluded from the initial marketing. All other PCPs were urged to participate and there was no attempt to be selective either before or after the presentation was made to individual or small groups of physicians. Most of the marketing to physicians in Seattle and Spokane was initiated in July 1976 and completed by December 1977.

RELATED RESEARCH FINDINGS

While there have been many studies of physician participation in group versus solo practice and fee-for-service versus prepaid reimbursement systems, there have been no studies about physician participation in IPAs. However, one author, Mechanic (1974) found that the physician's philosophical orientation is the consistent and substantial predictor of receptivity to organizational innovations in health care delivery. He found that doctors in group practice and particularly those with lower incomes and those who are members of non-fee-for-service groups are particularly receptive to organizational innovations. Among non-group physicians the only consistent predictor of receptivity to organizational innovations was the political-philosophical orientation of the solo physician.

STUDY OF PHYSICIAN PARTICIPATION

Methods

The population for this component of the project was defined as: physicians residing in metropolitan Seattle, metropolitan Spokane, or metropolitan Bellingham in Washington State or in Yuba County in California who had been given a UHC marketing presentation. The sample was stratified by geography and number of patients enrolled in the panel, and included 100 percent of all eligible physicians who had joined in Bellingham, Washington and Yuba County, California. It also included 100 percent of all physicians in Seattle and Spokane who had more than 49 patients in their panel, and all physicians who had refused to join UHC. A 50-percent sample was selected of all physicians in Seattle and Spokane with less than 49 patients in the panel. In addition, for purposes of analysis, the sample was reduced to 50 percent of all participating physician group practices.

Of the 634 physicians given a UHC presentation and the opportunity to participate, 527 chose to participate in the plan. The overall response rate for the survey among joiners was 94 percent and among nonjoiners, 73 percent (overall 88 percent response rate).

A telephone interview provided data on joiners and nonjoiners; separate instruments were developed for each group of physicians (Volume III, Appendix IV.1). Interviews were conducted by five individuals with previous training in telephone interviewing techniques. They had a five-day training session to introduce them to the plan, the study and the administrative protocols for completing the interview. Three practice interviews were conducted by each interviewer and close supervision was implemented throughout the duration of the study. One out of every 10 interviews was validated by a separate interviewer but no serious discrepancies were found.

Physicians in the sample received introductory letters encouraging them to participate in the study from their local medical society, from the state medical association and from UHC (Volume III, Appendix IV.2). Interviewing began May 21, 1979. All interviews were conducted with the physician and refusals were taken only from the physician rather than from a staff member. Only questions regarding administrative characteristics of the practice were allowed to be answered by his or her office staff. The interview for joiners was longer, averaging 20 minutes. For nonjoiners it lasted an average of 15 minutes.

The first set of research questions focused on reconstructing the reasons for the initial decision about joining the plan, realizing that this would be colored by the intervening two and a half year experience either on the plan for joiners or off the plan for nonjoiners.

The relationship of joining status to several categories of explanatory variables was examined. The explanatory variables included demographic characteristics of the physician, practice characteristics such as group practice, patient volume, referral patterns, practice income and third party reimbursements, the physician's perceived cost of selected procedures, the physician's fees and the amount of time he or she spent with patients for selected routine visits, such as upper respiratory infection, urinary tract infection and hospital follow-up. Attitudes regarding regulation of health care delivery and knowledge of UHC were also treated as explanatory variables in attempting to explain the joining status of the physician. It is likely that participation in UHC for those two and a half years changed physician's knowledge of the plan from what it was before joining and may have also changed their attitude about control of health care costs. This is more likely the case than that the attitudes and knowledge influenced joining status. Because of this factor we did not include these variables in the discriminant analysis. We also examined the relationship between these two variables (attitudes and knowledge) and length of time in the plan, account balance and number of UHC patients.

The second set of research questions examined the effect of joining UHC on the PCP's practice habits. We were interested in determining the physician's perception of the effect of the plan on his or her practice. UHC management had hoped that the concept of individual financial accountability and comparability across physician groups would have an impact on physicians' cost consciousness. We did not measure this effect directly but asked physicians if joining UHC had increased their awareness of costs. Also, we were interested in whether physicians were treating UHC patients differently from others. We gathered such information by asking the physician to compare the amount of care required by UHC patients with that required by other patients in their practices.

The last set of questions addressed physician satisfaction with UHC. Physicians were asked to rate their overall satisfaction with the plan as well as their satisfaction regarding various aspects of the plan such as amount of paperwork, reimbursement amounts and coordination of care for patients.

Results

Reasons for Joining

In spite of the new features of risk-sharing by PCPs and the insurance company sponsorship, UHC was successful in attracting widespread participation by PCPs in the plan. Eighty-three percent of those who had received a marketing presentation chose to join the plan. Only 12 physicians (2 percent) of those who had joined dropped out of the plan during the two and a half years between the marketing period and the study. The most important reasons that physicians gave for joining UHC were fear of losing existing patients and peer advice. The most important reasons for not joining UHC were the PCP's fear of intervention in his or her practice and the fear of financial risk.

The results of a discriminant analysis to determine which variables were significant in discriminating between joiners and nonjoiners are presented in Table IV-1. The number of years the physician had practiced in the county was negatively associated with joining. Pediatricians and all physicians who practiced in multi-specialty groups or in other group practices (as opposed to solo practice) were more likely to join. As expected, those physicians with a high percentage of uncollectable bills and those who had a large number of new self-referred patients each month were more likely to join. Those physicians who estimated that their patients' need for care was less than other physicians and the number of referrals they made to other facilities was less than other physicians were more likely to join this plan. Using these nine significant variables, 72 percent of the physicians were correctly classified as to their joining status.

Table IV-2 shows those variables which were not significant in predicting joining status. Of the demographic variables, specialty certification, subspecialty and physician gender were not significantly related to joining. Because physician age and number of years since residency were highly intercorrelated with number of years the physician had practiced in county, these variables were not significant. Number of persons with whom the physician practiced in his group, percentage of patients seen for primary care, patient volume and referral patterns to and from physicians were not significantly related to joining, nor were satisfaction with professional income, percentage of patients with third party coverage or timeliness of third party reimbursement. Neither physicians' knowledge regarding the cost of selected procedures nor the fees and time spent for selected diagnoses were significant in predicting joining status.

When we looked at the relationship between attitudes about control of health care costs and their relationship to joining we found significant correlations. In Table IV-3, as expected, joiners were more likely to agree that PCPs can control the use of services and that UHC can control health care costs and limit government intervention in the health care delivery system. These correlations were significant even when controlling for the most significant demographic variables (specialty, group practice, years in the county and percent uncollectable bills.). Similarly, knowledge of UHC was correlated with joining status; however, after controlling for demographic variables, only knowledge that PCP pays account deficit remained strongly related to joining. These results must be interpreted cautiously because this survey was conducted after physicians were members of the plan for two and a half years. None of the three independent variables, length of time in the plan, account balance and number of UHC patients, was related to attitudes and only number of UHC patients was related to knowledge about the plan ($p<.05$).

At the time of the study, most physicians had few UHC patients. On average, physicians had been in the plan for 29

TABLE IV-1

DISCRIMINANT ANALYSIS: SIGNIFICANT PREDICTORS OF PHYSICIANS JOINING UHC

Direction with Joining	Significant Variables ($p<.0001$)
-	Years practicing in county
+	Pediatrician
+	Recall of UHC marketing presentation
+	Multispecialty group
+	% uncollectable bills
+	Number of new self-referred patients each month
-	Number of patients referred to ERs, clinics, or community agencies each month
+	Group practice
-	Own patients' need for care relative to other physicians' patients

		Classification	
	N	Predicted Nonjoiners	Predicted Joiners
Nonjoiners	78	65%	
Joiners	254		74%

72% correctly classified

TABLE IV-2

DISCRIMINANT ANALYSIS: VARIABLES THAT WERE NOT SIGNIFICANT IN PREDICTING PHYSICIANS JOINING UHC

Non-Significant Variables ($p>.05$)
Sex
Age
Years in residency
Specialty certification
Subspecialty
Number of MDs in group
% primary care patients
Patient volume
Referral patterns
Satisfaction with professional income
% practice income from welfare
% patients with health insurance
Timeliness of reimbursement from other health insurance companies
Fees and time spent with patients for selected routine visits
Perceived costs of selected procedures

TABLE IV-3

CORRELATIONS BETWEEN JOINING UHC AND PHYSICIANS' ATTITUDES ABOUT CONTROL OF COSTS AND PHYSICIANS' KNOWLEDGE OF UHC FEATURES

	Correlation With Joining	
Attitude	Simple	Partial
PCP can control use of services	.17[ʃ]	.20[§]
UHC can control health care costs	.39[§]	.40[§]
UHC limits government intervention	.37[§]	.41[§]
Knowledge		
PCP must approve all care	.34[§]	.28
% of PCP charges UHC pays	.12[†]	.08
PCP pays if deficit in account	.25[§]	.25[§]

* Controlling for specialty, group practice, years in county and percent uncollectable bills.

[†] $p < .05$

[ʃ] $p < .01$

[§] $p < .001$

months and the median number of UHC patients in their practice was 25, with a range from 1 to 414 patients. Only 2.6 percent of the physicians had more than 100 UHC patients in their practices. Eighty percent of the physicians knew which of their patients were in the UHC plan, and this knowledge was not related to number of patients ($p>.05$). Also, panel size was not related to awareness of costs, satisfaction with the plan or satisfaction with reimbursement ($p>.05$). Furthermore, number of patients in the plan was not related to the physician's perception of the amount of care required by UHC patients compared to other patients ($p>.05$).

As was noted in the previous chapter, final account balances were generated in March of the new year, thus capturing most claims. In examining the 1978 end-of-year UHC account balances for the PCPs, it was obvious we were dealing with small amounts. Thirty percent of the physicians had a deficit in their accounts. The mean deficit was $288, and the median deficit was $105, with a range from $1 to $2,877. The distribution was very skewed with only 3 percent of the physicians having more than $500 deficit in their accounts. Seventy percent of the physicians had a surplus in their account. The mean surplus was $430 and the median surplus was $58, with a range from $1 to $4,987. Here, too, the distribution was skewed with only 8 percent of the physicians having more than $1,000 surplus in their account. Furthermore, their shares of the deficits and surpluses were limited to 50 percent of the above amounts. Account balance was correlated with number of UHC patients in the panel ($p<.05$) and with the physician's perception that UHC patients needed fewer referrals for elective surgery and were more prone to get outpatient rather than inpatient surgery ($p<.05$). However, account balance was not related to physician age, specialty or group practice status ($p>.05$). Neither was it related to satisfaction with reimbursement, awareness of health care costs or satisfaction with other aspects of the plan ($p>.05$).

It is clear from reviewing the dollar amounts in the deficits and surpluses that in 1978 UHC financial incentives do not have a significant impact on physician incomes. Thirty-eight percent of the physicians said that they were more aware of costs since joining UHC, but 62 percent of physicians said their awareness of costs had not changed. Furthermore, awareness of costs was not related to length of time in the plan, number of patients in the plan, or account balance.

As evidenced in Table IV-4, physicians' perceptions were that UHC patients required significantly less emergency room visits, referral for elective surgery, second opinions before surgery, and lab and radiologic tests. The largest difference was in the perception of the amount of emergency room visits required by UHC patients. The reasons for these perceptions

TABLE IV-4

JOINERS' PERCEPTION OF AMOUNT OF CARE REQUIRED BY UHC PATIENTS COMPARED TO OTHER PATIENTS IN THEIR PRACTICES

Type of Care	% Joiners (N=269) Perceiving that UHC Patients Require: Less	Same	More	Significance of the Percentage Less or More
ER visits	22	74	4	*
Referral to other doctors	10	84	6	-
Referral for elective surgery	9	89	3	*
Second opinion before surgery	7	91	1	*
Lab tests and x-rays	4	95	1	*
Frequency of F/U for routine conditions	3	94	3	-
Outpatient surgery	3	94	3	-
Generic drugs instead of name brands	0	99	0	-

*McNemars Test ($p<.05$)

are not clear, but may be related to the physician's awareness of actual use by UHC enrollees, compared to his or her perception of typical use.

Physician Satisfaction with UHC

Results of the survey of physician satisfaction appear in Table IV-5. Overall, 89 percent of the physicians were satisfied with the plan. They were slightly less satisfied with specific features such as the patient's understanding of UHC, the paperwork required by the plan and the responsiblity of coordinating care for UHC patients. Physicians were most satisfied with the amount of reimbursement by the plan. Furthermore, the two most desirable features of the plan were the prepaid comprehensive coverage for the patient and the coordinating role of the PCP. The least desirable feature of the plan was the financial risk sharing by the PCP.

Discussion and Conclusions

The first major conclusion from this study is that widespread participation by PCPs in an insurance company-sponsored plan which puts them financially at risk is achievable. Five out of six physicians who were given a brief presentation by an insurance company representative decided to join this plan. Perhaps that is not so surprising in a competitive environment like the large cities of Seattle and Spokane. However, the decision to join seemed to be as common in physician shortage areas such as rural California and Bellingham, Washington as it was in urban Seattle and Spokane. It is not surprising that younger physicians, and those who are members of groups and those who are doing more primary care were more interested in joining than others. It was also expected that the most common reason for joining would be the threat of losing existing patients to this new system.

SAFECO was careful in its initial marketing to make the plan as attractive as possible to private physicians. The fee-for-service reimbursement system was to be retained until panel sizes grew to more than 50 patients. This initial arrangement was later changed to be more than 200 patients. When panel sizes reached this number, the physician reimbursement was changed to a capitation for primary care services rather than a fee-for-service reimbursement. However, less than 5 percent of physicians were ever put on a primary care capitation system and even when they were, this amount was held quite close to fee-for-service billed charges. The risk sharing for total health care costs was kept small so that no physician would end up with less than 85 percent of his or her billed charges. For most PCPs this represented more than they were receiving from other insurance plans who used fee schedules. In addition there was no initial attempt made by the plan to change referral patterns or to reduce hospital or office services through utilization review. The

TABLE IV-5

PHYSICIANS' SATISFACTION WITH UHC

	Percent of Physicians (N=269)	
	Satisfied	Dissatisfied
Patients' understanding of UHC	80	20
Paperwork required by UHC	81	19
Coordination of care for UHC patients	84	16
Amount reimbursed by UHC	93	7
Overall satisfaction	89	11

general concept being promoted was that if paid well and given a responsiblity and small financial incentive to coordinate the delivery system, the PCP would create a more cost-effective system than currently existed. This challenge itself attracted some PCPs into the plan. Also the idea that they were now in the driver's seat, controlling access to the entire delivery system was attractive to some physicians. Thus, while the discriminant analysis on variables that predict a physician's willingness to join is academically interesting, it is of little practical significance. The features of this plan were so attractive and such a large number of physicians participated that later the plan needed to terminate physicians in order to reduce the number to a more manageable size.

With more than 500 PCPs participating, the number of enrollees per physician could only be small in the early years of the plan. At the time of our study, which averaged two and a half years after the physicians had joined, there was still a median of only 25 patients in each physician's panel. This is one of the major constraints of all IPA plans with such broad membership. The fact that each physician is receiving only 1 to 5 percent of his or her patients from the plan makes him or her less involved and less interested in what is being attempted. This limited involvement also compromises any potential for a natural evolution of attitudes and practice styles because panel sizes grow so slowly when large numbers of physicians are enrolled. Even if the physicians in this plan had been under a true capitation arrangement from the very beginning, the more pervasive fee-for-service incentives and mentality in the other 95 percent of their practice would probably have prevailed. It becomes very unlikely that a physician will change his or her entire practice based on the incentives and controls existing in only 1 to 5 percent of his or her practice.

Physicians are reluctant to admit that they treat patients differently on the basis of their insurance coverage. Because of this reluctance, we queried physicians instead about their perception of the amount of care required by UHC patients compared to the rest of their practice. The physician's perceptions were that UHC patients were incurring significantly less emergency room visits, referrals for elective surgery, second opinions before surgery and laboratory tests and radiographs. These are physician perceptions and not real differences in service levels. We had no way in this survey of checking whether physicians are simply telling us what they think we want to hear or whether they have actually changed their practice habits for these patients.

Whatever the impact of this plan on physicians, it is clear that the physician's overall satisfaction with the plan was very high. With 9 out of 10 physicians expressing overall satisfaction with the plan, it is quite likely that the plan had not significantly altered their usual way of delivering health care. These figures fit the anecdotal responses of most physicians which indicated that the plan allows them to do as they always have without any interference in their practice styles.

The primary goal of the plan was to influence the PCPs to begin using a more cost-effective approach to these patients. They were supposed to substitute short-stay surgery and generic drugs for more expensive alternatives. They were to use more clinical judgment and less laboratory and radiographic procedures, and more second opinions before elective surgery, and to refer to surgeons who were more conservative about doing surgery and more efficent in choice of procedures, tests and hospitalizations when surgery was indicated. Not surprisingly (given the average penetration in a physicians practice), these physicians were resistant to outside influences on their practice style. It is unlikely that with an average of only 25 patients in their panel, they would begin looking for more cost-effective ways of delivering care because of their small scale involvement in this plan.

It was also clear from more informal talks with the physicians that the individual account system had actuarial problems. With small numbers of patients in each account, it was usually uncontrollable events rather than practice styles which determined the outcome of these individual accounts. In some instances the physicians would adhere to the intent of the plan by not allowing self-referral by the patient and carefully monitoring specialist care only to realize that one or two sick patients who needed a lot of care determined the deficit or surplus remaining in his account at the end of the year. This realization would significantly dampen faith in the fairness of the individual account system and the shared risk feature for total care costs. It was apparent that many physicians came to regard the financial incentives very lightly. They felt that 85 percent of charges was acceptable and if they happened to get 105 percent of charges (because of a surplus), it would be a welcome bonus but not something they could count on as a result of their own efforts. The plan was never able to find a way of adjusting the accounts for health status of the enrollees. Thus the issue of self-selection of sicker, more costly patients into some physician's panels was always raised as a reason for any deficits. This problem always affected credibility and potential impact of the plan on physician practice habits.

One is left with the conclusion that UHC succeeded in creating a very widespread network of physicians largely because it minimized any changes from the private fee-for-service delivery system. It was never the stated goal of the originators of the plan to interfere with medical practice, but merely to modify counterproductive practices and to reduce the cost of medical care. These savings could occur with minimal change in physician behavior if the system were changed enough to cause patients to receive a different mix of services. It may be that the physician does not treat patients any differently whether he or she is a gatekeeper or a physician practicing in an open system. Rather it is the closed system in which each patient must go past the gatekeeper that changes the access to as well as the mix and cost of total health care services. Whether this occurred in the UHC system will be addressed in later chapters. It is likely that any change in physician behavior or cost effectiveness requires the physician to be more motivated and involved, not only as gatekeepers but as true coordinators willing to monitor and police specialists, pharmacists and hospitals. In order for this to occur, most physicians will require a greater stake in the system than was theirs in UHC.

CHAPTER V

CHOICE OF PLAN*

INTRODUCTION

Families in recent years have had the opportunity to choose among new models of delivery and financing of health care. Independent practice plans, closed-panel group practice plans and other types of innovative health care systems have become more common. These systems incorporate financing with provision of services, thus limiting risk and containing costs. This innovation increases the importance of the choice of "insurer" to the consumer because this decision will determine not only the family's financial requirements but also its access to care.

An important facet of the success of these new options depends on their ability to attract enrollees from other plans, since the majority of employed people in the United States have health insurance. The feasibility of attracting enrollees, however, depends on many factors, such as past experience with other plans, sociodemographic attributes of the enrollees, and past and expected need for care from the system. In addition, there are issues of willingness to accept change or innovation. Is the consumer willing to experiment with a new type of plan as well as a new plan? This chapter identifies those factors which influence families' preferences.

Attracting consumers is an issue of marketing strategy from the point of view of the health care plan administrator. A plan must be competitive with regard to benefits, costs and accessibility of care, but it must also attract a "conscientious" clientele--one that appreciates the value of preventing excess use of the plan, thereby reducing the costs to the plan. The economics literature refers to the tendency for insurance protection to lower an individual's motivation to prevent loss as "moral hazard" (Shavell, 1979). This is of concern to the insurer: an increase in the consumption of medical care by a family increases the cost to the insurer.

Several strategies are used by the health insurance industry to "protect itself" against the moral hazard. Beyond avoidance of particularly high risk groups through selective marketing, there are various strategies with respect to individual enrollees: (1) exposing the consumer to some financial risk for care through deductibles or copayments; (2) limiting benefits to exclude coverage for high risk or assured losses such as pre-existing conditions or high frequency items such as eyeglasses; (3) monitoring all care and costs of care through control over the delivery of services.

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The shared control between provider and consumer with respect to use of health services makes the issue more complex. Frequently, it is the provider who determines the extent of expensive services once the consumer has initiated a low-cost visit. Given the ramifications of such control, the insurer must seek to minimize both provider-originating and consumer-originating tendencies to lower motivation to prevent loss.

The prepaid health plan concept is not a new way to approach the moral hazard problem. Variations of it have existed for at least two hundred years (MacColl, 1966). The concept of integration of care and financing has been viewed as a viable control over escalating medical care costs and high quality accessible care for all. The financial viability and the consumer's satisfaction with the care provided through the many plans in operation over the past few decades have been key issues in the documentation of these systems. Whether the moral hazard is reduced, however, is still under investigation. Any new method suggested to address the problem is worthy of careful study.

Given the unpredictability of the need for service and the rising costs of medical care, insuring access to health care and insuring against the devastating costs of illness is considered by many consumers to be a necessity. In settings where health insurance is a benefit of employment, the decision to select a particular type of plan involves benefit structure, accessibility of care, expediency of reimbursement and costs to the family. Often, several options are offered: a Blue Cross-type plan, other indemnity-type private carriers, hospital versus major medical coverages or catastrophic illness plans. Under certain circumstances, in accordance with requirements of the 1973 HMO Act (Public Law 93-222) and its amendments (P.L. 94-460 and P.L. 95-559), employers are required to offer a federally qualified health maintenance organization (HMO), if requested, as an alternative to other plans. For those consumers not familiar with the structural or organizational differences and therefore the implications of their choice, the decision requires considerable effort.

A new health care plan considering entry into a market must, therefore, consider the economic practicality of its survival among already-insured enrollees and the interest and effort required by the prospective enrollee to change to a new plan. In order to assess the economic feasibility of survival in such an environment, the new plan must be able to identify the type of subscriber it would attract. To determine the effort required of the subscriber to change plans, the plan must be able to consider the several factors believed to be important by the potential enrollee. Important among these in the case of an HMO would be the psychic costs and risk associated with changing to a new type of plan, and in some cases a new provider of care.

The study population here is composed of Washington State employees, including those in higher education, who live in King County (which includes Seattle). This population is not new to the concept of health insurance (including prepaid practice), nor are its members unaccustomed to structural diversity in the manner in which health care is delivered and financed. The Seattle area has one of the largest consumer-owned prepaid group practices in the nation. In addition, Washington State employees have experienced traditional indemnity-type coverage as well as service benefit plans. In 1978, premiums for all options were paid by the employer. The setting of the introduction of a new type of plan, a prepaid primary care network plan, offered a test of acceptance and survival in a well-developed and experienced market.

During the study period state employees were offered three health care plans: Blue Cross of Washington and Alaska (BC), Group Health Cooperative of Puget Sound (GHC) and United Healthcare (UHC). Employees could remain with their traditional fee-for-service plan (BC), or their closed-panel group practice plan (GHC), or, for the same cost in premium ($0, since the state paid the premium), enroll in a new primary care network plan (UHC). This natural experiment allowed examination of the key differences between those who demonstrated their interest in the new plan by switching plans and those who did not. The study's uniqueness is that critical variables which are suspected to relate to this decision were examined.

Some form of coverage for the health care needs of the population has come to be viewed as essential. Understanding the factors which affect an experienced consumer's decision to accept innovation, if it can be seen as such, in the primary care network type of plan, offers planners, policy makers and health care researchers valuable data. Health care planners and policy makers must face issues of competition in the health care marketplace, acceptability of new delivery and financing structures to both consumers and providers, and plan and enrollee assessments of future risk. In addition to descriptive information on the decision process, health care researchers need careful measurement and analysis of a wide array of factors that influence decision-making at the family level.

PREVIOUS RESEARCH

"A person is faced with a decision problem whenever there is a choice between at least two courses of action" (Lindley, 1971). For those families in this study, the decision involved only two courses of action--to remain with their present plan, or to change to UHC.* Since all members of the sample had been employed at least two months prior to the annual open enrollment period, all members under study had the opportunity to change plans and were therefore faced with an "exclusive" and "exhaustive" list of choices; that is, exactly one of them had to be taken.

Because the populations under study here have had experience with at least one type of plan, they enter into the decision with some knowledge of health insurance and perhaps some experience with its role and function. Each group, whether having experienced GHC or BC, is faced with a new option with some of the same attributes as their plan's health care financing and/or delivery system, but with some differences in other respects.

Previous research has contributed varying amounts of information on the decision process and the factors which affect it. Applicability of the results of the early research was constrained by dual-choice rather than multi-choice settings. Most of the early interest lay in the characterization of enrollees in prepaid group practice plans versus those in conventional solo practice, fee-for-service plans.

Research of the late 1960's suggested and then dismissed the possibility that ideology and attitudes influenced choice (Metzner and Bashshur, 1967). Instead, information was suggested by some as the key: choice of plans was found by Metzner and Bashshur to be based on "specific valued attributes of the plans" (Ibid, p. 43). Twenty-six attributes were considered by their sample; included were accessibility to a doctor or a hospital, administrative costs, having a "homelike doctor's office" and coverage for drugs. But the following year, results of a much larger study of ten different health care plans in California failed to support their hypothesis: state employees gave no evidence of awareness of plan attributes (Report of California Medical, 1968).

Further investigation of the consumer choice issue led Bashshur and Metzner to posit a set of relationships they characterized as a position of "vulnerability", based in part on the theory that those with a "favorable predisposition toward the issues involved" are more likely to be influenced by a campaign. Vulnerability is explained:

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*State employees had a third choice as well; namely, to switch from GHC to BC or vice versa. The emphasis of the study, however, is on the offering of the UHC alternative; and, therefore, we did not examine during the course of this research the decision to change to either BC or GHC. The "no plan" alternative also is not studied here; those who fail to specify a health care plan during their first month of employment are automatically assigned to BC coverage.

> "Persons in the younger age groups, single persons and those with no dependents, and those of lower economic status as measured by several indexes (family income, home ownerships, zonal analysis, neighborhood income level) may be viewed as having a lesser economic "stake" and therefore feeling themselves less vulnerable to serious economic loss in meeting health needs. Older persons, those with higher incomes, and those with dependents, on the other hand, may be considered to run a greater economic risk or to be greater health risks (or both) and hence to be more vulnerable." (Bashshur and Metzner, 1970, p.111.)

This concept of "risk vulnerability" was a significant contribution to the understanding of the factors which affected choice. It became increasingly popular as researchers were given new opportunities to test hypotheses in the more prevalent multi-choice settings of the 1970's.

One of the first studies of the decade to examine the multi-choice setting was that of Moustafa, Hopkins and Klein (1971). This small pilot study looked at a seven-plan (including no plan) choice for the purpose of generating hypotheses which could then be tested on larger population groups. The hypotheses were now focused not on individual characteristics of enrollees and plans but on a combination of factors. The pilot study examined many of the factors of earlier studies: personal factors, such as sociodemographic, economic and cultural factors; ideology, political beliefs and attitudes toward health; and plan characteristics, such as cost, benefits, availability and convenience of services, and expected out-of-pocket expenses.

No definitive relationships were found between choice of plan and most of the factors. However, there were two significant findings: (1) "younger single employees favored plans that were limited in coverage and less expensive, while married employees, especially those with children, favored more comprehensive plans;" and (2) while "extent of benefits" came to the forefront as significant for married employees with children, respondents did not have detailed knowledge of the extent of their coverage or the limitations of their plans (Moustafa, et al., pp. 40-41).

The extensive research in use of health services being undertaken in the seventies demanded further exploration of the concept of health status and need for health services (Mechanic and Tessler, 1976). The improved measurement of these constructs coincided with the rekindled interest in the risk vulnerability hypothesis, now being tested with the subdivisions of medical and economic vulnerability, "expectations about needs for services" versus "expectations about effects of (coverage or) costs for services" (Bice, 1975). In one of the only prospective studies of choice of plan, Bice measured risk vulnerability with illness and histories of use of services; health status of the heads of families was a multi-variable measure; and use of services was summed across all family members so that analysis could be performed by family unit rather than by individual, the common unit of analysis in most of the previous studies. He found risk vulnerability to be positively associated with enrollment in a prepaid plan offering greater coverage than the alternative. Bice's study looked only at whether or not there was enrollment in a prepaid plan or the family continued under their current arrangements--a situation similar to this study.

Up to this point, there were major gaps in the health services research. Mental health was still a novel component of health status constructs; the analysis in previous research was still mainly by individual rather than family; the effects of premium differential could not be eliminated naturally; most studies looked only at new enrollees rather than those with health plan experience.

In the late 1970's, Berki and colleages from the University of Michigan brought new depth to the study of the consumer choice-of-plan issues. A multi-choice situation was studied, and multivariate rather than the traditional bivariate analysis was performed on the common theses and variables of earlier research as well as on less common but hypothetically salient variables.

These researchers proposed a broader paradigm. They tested again the vulnerability hypothesis--both health risk and economic risk--as Bice had postulated. They looked more carefully at the enrollment decision with a conception that separates out choice of insurance from choice of provider (Berki, et al., 1977; Ashcraft, et al., 1978). Since the "focus of the new analysis was choice and not HMO experience," the analyses compared new enrollees in any of the HMO-type plans with Blue Cross/Blue Shield subscribers (continuing enrollees) (Berki, et al., 1977, p. 106).

The findings of these studies reinforced some and contradicted other findings of the earlier studies of sociodemographic factors in that HMO enrollees (closed- or open-panel) were found to be younger and have larger families; open-panel plan enrollees were more likely to be married and have higher incomes than closed-panel enrollees, but there were no differences between closed-panel enrollees and Blue Cross/Blue Shield subscribers "in terms of marital status, education and age," (Berki, et al., 1977, p. 110).

The vulnerability hypotheses met with mixed results. There was no evidence in the findings of adverse health risk but the concept of economic vulnerability (as measured by per capita income) was supported as a factor in choice by the fact that lower income families and larger families are more likely to enroll in HMO's.

The importance of having a usual source of care was explored by these researchers and found to be a significant predictor of choice. Families with private physicians as usual providers were less likely to enroll in any HMO-type plan and more likely to join an open-panel plan to continue the relationships. Those without a private physician were more likely to join a closed-panel plan. Having a private physician as a usual source of care was not significant in the Blue Cross/Blue Shield versus open-panel plan enrollment decision but was significantly related to enrollment in Blue Cross/Blue Shield over a closed-panel plan.

Family life stage, a measure which can incorporate age of the family, marital status, and presence and age of children (as in the earlier literature of Bashshur and Metzner), has received more attention as a predictor of HMO enrollment; families with younger children--at higher risk--being the ones more likely to enroll in any of the HMO options (Berki, et al., 1978). Again family income was found to be a significant predictor of HMO enrollment with increased likelihood of enrollment in closed-panel plans in families of lower per capita income, and greater likelihood of enrollment in open-panel plans in higher income families. A summary of Berki's later findings reveals support for both the financial loss and the risk perception hypothesis, with the greatest "predictors of choice of plan" being "usual source of care, the number of chronic conditions and the sociodemograhic variables associated with potential health risks" (Berki, et al., 1978, p. 695).

The research reported in this chapter looks at the change from a comprehensive BC plan or a prepaid group practice to an independent practice plan. In this way it is different from earlier research which looked mainly at the traditional insurance plan versus only the prepaid plan. At the same time, early researchers also could examine the effect of differences in comprehensiveness of benefits, while in this study benefits are quite similar among the three options. In spite of the limitations in the application of earlier studies to this setting, their introduction of the concepts of vulnerability, accessibility and patient satisfaction with provider into choice of plan research was significant.

The literature on choice of plan leads us to examine factors such as: presence of a usual provider as a measure of accessibility; family characteristics which reflect stage of development of the family as an indicator of medical risk, risk perception or need; family income and family size (per capital income) as an indicator of risk of financial loss due to illness. The model proposed here relies on some of these factors in addition to others believed important in this particular setting: the presence and extent of other insurance coverage in the family; the physical and mental health of the enrollees; the length of experience with GHC and BC; the relationships in a family with usual sources of care (namely, recency of use, satisfaction with provider, ability to continue relationship under a new plan); time-based accessibility of care; and actual use of health services during the period immediately preceding the choice.

All these indicators are evaluated in a framework which assumes that the decision maker acts as if to maximize his or her expected utility. Within such a structure, it is hypothesized that the decision maker is affectd by the realization of an uncertain future that includes: (1) need for health care services; (2) accessibility of health care providers; (3) financial capability to cover the costs of health services; and (4) experience with services from the health care plan. More specifically, it is hypothesized that the following are the sets of factors that influence the decision maker:

- need for health care, as measured by family life stage and health status
- accessibility to health care service, as measured by relationships with usual providers, and time-based access to care
- financial capacity to cover the costs of services as measured by per capita income, other insurance coverage and potential earning power of the family
- experience with the health care plan, as measured by exposure to the plans, and satisfaction with costs for care and plan services.

SAMPLE

The population of interest to the consumer-choice segment of this study consisted of individuals who:

(1) were employed by a Washington higher education or other state agency;

(2) resided in King County, which includes the city of Seattle;

(3) had a health plan effective date prior to May 1, 1978 and were active employees as of December 31, 1978.

These criteria eliminated from the population employees who were not eligible to switch coverage in the May 1978 open enrollment period, during which BC, GHC and UHC were offered as the health plan alternatives. Employees excluded from the population were those: (1) newly hired; (2) employed less than two months; or (3) retired. Thus the four groups of interest were:

(1) enrollees who chose to remain with BC;
(2) enrollees who chose to remain with GHC;
(3) UHC enrollees previously with BC; and
(4) UHC enrollees previously with GHC.

A family unit was defined for these analyses as a subscriber and all covered family members. Table V-1 presents a classification of the eligible population of family units and the sample included in the study. (The sample size was determined by examining the smallest difference which could be detected between two groups, assuming equal size (see Volume II, Appendix V.1). A total sample of 1936 subscribers was chosen.

Response rates for the household survey are presented in Table V-2. On contact with the families, 85.4 percent were found to be eligible for this study. Major reasons for ineligibility were termination of state employment by time of interview, residence outside of King County and retirement from state employment. Eleven subscribers or half of one percent of the sample could not be contacted, which resulted in an overall eligible population of 1654 subscribers.

Of those eligible for the study, 5.1 percent refused the household interview; 94.9 percent agreed to participate. Of those who participated, 38 families (2.3 percent) provided incomplete information for some individuals. Complete information was collected on 1532 families in the sample.

Since our model assumes that the sample is of those families who had a choice of health plans, only those families who reported knowledge of open enrollment are considered here. There were 73 families who did not meet this criterion; they were excluded from the total number of the fully or partially completed interviews. Thus, the final sample size for these analyses is 1497 families.

DATA SOURCES

A household interview provided the information for most of the choice-of-plan analysis. In order to address explicitly the question of potential adverse selection into UHC, data on use of health services before the 1978 opportunity to switch plans, from claims and medical records, were added to the analysis.

Four versions of the household interview schedule, one for each subscriber category of interest, BC, GHC, BC-UHC, and

TABLE V-1
POPULATION AND SAMPLE DISTRIBUTION OF HEALTH PLAN SUBSCRIBERS

	Group				
	BC	GHC	BC-UHC	GHC-UHC	Total
Eligible Population	8148	7619	676	192	16630
Sample (subscribers)*	722	518	504	192	1936
Sample as proportion of population	.09	.07	.75	1.0	.116

*The total sample described in this table was subsequently reduced to a study sample as shown in Table V-2.

TABLE V-2
SUBSCRIBER RESPONSE RATES FOR HOUSEHOLD INTERVIEW BY HEALTH CARE PLAN

	GROUP									
	BC		BC-UHC		GHC		GHC-UHC		Total	
	N	%	N	%	N	%	N	%	N	%
Sample	722	100	504	100	518	100	192	100	1936	100
Eligible	640	88.6	422	83.7	434	83.8	158	78.6	1654	85.4
Ineligible	75	10.4	81	16.1	82	15.8	33	17.2	271	14.0
No contact	7	.97	1	.20	2	.39	1	.52	11	.57
Eligible										
Complete	585	91.4	396	93.8	404	93.1	147	93.0	1532	92.6
Incomplete	14	2.2	11	2.6	9	2.1	4	2.5	38	2.3
Refusal	41	6.4	15	3.5	21	4.8	7	4.4	84	5.1
Respondent familes (as % of eligibles)	599	93.5	407	96.4	413	95.2	151	95.6	1570	94.9
Respondent families eligible for decision* (as % of respondents)	554	92.0	407	100.0	385	93.0	151	100.0	1497	95.0

*N for analysis: eliminates 73 families who reported no knowledge of the 1978 open enrollment period.

GHC-UHC were developed and pretested (Volume III, Appendix V.1). Prior to the interview, subscribers in the sample received letters introducing the study from the SEIBUS principal investigator, their respective health care plan and the State Employees Insurance Board (Volume III, Appendix V.2). University of Washington employees also received a similar letter from the University president. Participation in the study was strictly voluntary; thus, before proceeding with the interview, the subscriber's written consent was obtained (Volume III, Appendix V.3). Interviewers asked all family members to be present during the interview. They collected information on the subscriber and all dependents covered by the subscriber's state plan during the interview. Interviewers addressed most questions to the subscriber, but asked the spouse and children at least 19 years of age to respond to questions about themselves. The adult with most knowledge regarding the health care of family members provided information on those under age 19. Interviewing for this element of the study took place between April 1979 and January 1980.

Sources for the development of the household interview schedule included similar survey instruments from the Federal Employees Health Benefits Project Utilization Study, the Seattle Prepaid Health Care Project Study and the National Medical Care Expenditures Study (Riedel, et al., 1975; Richardson, et al., 1976; Walden, 1977).

METHOD OF ANALYSIS

The primary objective of the analysis was to identify the significant factors affecting the decision to remain with either BC or GHC, or to change to UHC. The approach that is used, simply stated, assumes that the expected utility of the decision depends only on the decision maker's action, given his or her beliefs, tastes and an outcome function determined by himself or herself and the environment. action is under the individual's control; the other factors are not. The action which, in considering these factors, achieves the greatest expected utility is the one chosen.

Descriptive information was also collected to provide a picture of the decision process as perceived by families. Finally, the question of adverse selection was explicitly addressed by testing for the relationship between recorded health services use for all families before the choice, on the one hand, and the subsequent choice of UHC on the other. The latter relationship was analyzed controlling for the substantial number of variables included in the main analysis.

The model used for the main analysis consists of four separate sets of factors believed to influence the decision: need for care, access to care, financial capability to cover the costs of care, and past experience and satisfaction with the plans. By examining the factors which affect choice we are, in essence, estimating the degree to which each environmental state being tested contributed to the utility of the choice, assuming that the decision maker maximizes expected utility.

The dependent variable, switching or not switching, represents some measure of utility of the choice. Through the use of regression analysis, one predicts the ordering of preferences for switching or not switching. There are two basic assumptions in the choice of models. First, the approach assumes that all subjects have the same "tastes" or criteria as to what a desirable outcome would be; for example, all families desired low costs of health care, high quality, accessible services, adequate plan coverage, etc. This assumption permits one to consider together all members of either BC or GHC in developing estimates of this model. The second assumption is that the decision maker acts to maximize utility.

Once a complete array of possible measures for each of the four sets of factors was determined, linear discriminant analysis was used to identify the more limited number of variables actually affecting choice of plan.* Analysis of the decision was performed separately for BC switchers and nonswitchers, and GHC switchers and nonswitchers. A final model for each of the two groups was then estimated.

FINDINGS

Decision Process

Before turning to the multivariate analysis of factors influencing the choice of the UHC plan, we will consider the responses of switchers from the household interview that bear on the choice process. Information was obtained in the following areas: identification of the decision maker within the family; reasons for switching or not switching to UHC; sources of information about the plan; and satisfaction with information about the plan.

At the outset, it should be noted that a substantially higher proportion of BC families compared to GHC families elected to switch to UHC. The percent of BC families that switched to UHC during the 1978 open enrollment period was 8.3 percent compared to 2.5 percent of GHC families. Beyond the obvious conclusion that switching to UHC was more attractive to BC families than it was to GHC families, one should note that the GHC group of switchers may be in some sense a harder core group who on average might be more critical of aspects of the plan they were leaving. Recognizing the organizational differences between BC and GHC, it is somewhat surprising to find that decision-making within families in the two plans is very similar. An almost equal proportion of GHC and BC switchers to UHC reported that the subscriber alone made the decision to switch. (BC: 64 percent; GHC: 66 percent). For approximately 32 percent of each group, the subscriber and spouse jointly made the decision on which plan to choose. Even though health insurance benefits are consumed by all family members, it appears that the decision is usually made by the person responsible for the existence of the coverage. In only 2 percent of the GHC switcher families was the decision made by more than two members of the family; there were no cases of this reported by BC switcher families.

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*Stepwise multiple regression was occasionally used to obtain certain statistics not available from the discriminant analysis computer program that was used in this study.

Although the subscriber was the most common decision maker for the family, the change in plan was discussed in most homes: 82 percent of the GHC switchers and 79 percent of the BC switchers reported this consultation. BC swichers were more likely than GHC switchers to report discussing the plans with coworkers at the place of employment ($p = .07$). Seventy-five percent of the GHC switchers and 83 percent of the BC switchers indicated such discussions.

Respondents were also questioned as to other sources of information on UHC prior to open enrollment. While few respondents reported learning details from relatives, 1 percent of GHC switchers and 4 percent of BC switchers reported learning of UHC from their providers ($p < .13$). The vast majority of subscribers reported learning of the plan from the employer (BC: 94 percent; GHC: 93 percent). The next most frequently cited source was friends, with 9 percent of GHC switchers and 7 percent of BC switchers reporting this source. Both groups reported a high level of satisfaction with the information received on UHC, with approximately 94 percent of each group reportedly very or somewhat satisfied.

The major differences between the BC and GHC switchers were seen in the reasons for switching plans. Data collected on this topic took two forms: a list of potential reasons for switching or not switching to which the available response was yes or no, and open-ended questions as to the most important reasons for switching and other reasons for switching.

Considering the list of potential reasons for switching, there were a number of differences in reasons between families with prior experience in BC and those with experience with GHC (Table V-3). Financial incentives were of high priority for switchers, especially to former BC enrollees. We see this difference particularly with regard to: the lower out-of-pocket costs under UHC; the lower co-payment under UHC; and having no deductible under UHC.

TABLE V-3
DIFFERENCES BETWEEN FORMER BC AND GHC ENROLLEES IN THEIR REASONS FOR SWITCHING TO UHC

Reason	Group		$p \leq$
	From GHC %	From BC %	
Doctor recommended it	1	5	.04
Friends recommended it	19	11	.02
Family already had doctor in plan	31	53	.01
Wanted doctor and facilities close and convenient	60	45	.01
No deductible to pay	44	88	.01
Less payment	30	79	.01
Out-of-pocket costs are lower	30	89	.01
Freedom to choose doctors and facilities	83	45	.01
Wanted primary care physician for family	60	39	.01

Aside from the financial reasons for changing plans, recommendations of others and accessibility to care proved of differential importance to the families. Approximately 5 percent of BC switchers claimed to have changed to UHC upon the recommendation of their doctor, and 11 percent upon the recommendation of friends; only 1 percent of GHC switchers changed to UHC upon recommendation of their doctors, and 19 percent upon recommendation of friends. Recommendations played a much greater role than expected given the newness of UHC in the Seattle area. It might be assumed that some employees read the printed material more thoroughly than others and shared their insights with friends and co-workers.

Accessibility and freedom of choice issues were reported by a large number of families as important in the decision to switch plans; as expected, there were significant differences between the groups. A large portion (83 percent) of GHC switchers reported that freedom to choose doctors and facilities was a reason for switching to UHC, while 45 percent of BC switchers reported the same. Freedom of choice was expected to be an important reason for GHC families, but not for such a large number of BC switchers. Sixty percent of GHC switchers also reported that having doctors and facilities close and convenient was a reason for changing to UHC, while only 45 percent of BC switchers reported this factor as important. It seems likely from these results that accessibility is a major concern of UHC families who had had experience with the closed-panel plan.

It was not surprising that as many as 53 percent of BC switchers gave as a reason for switching the fact that they already had a doctor in UHC; however, 31 percent of GHC switchers reported the same. UHC was not marketed to GHC physicians because they are employees of the Cooperative; it appears that a significant portion of the switchers had already been receiving care outside of GHC.

Respondents were asked to identify the most important reasons for switching. Fifty-one percent of BC switchers reported that the broader coverage of preventive care provided by UHC was the major reason. Also frequently cited were provider-related reasons (mainly freedom to choose providers, desire for a primary care doctor and recommendation of provider) and the overall coverage provided by UHC. Only 7 percent of respondents reported dissatisfaction with BC overall coverage as the major reason for switching.

Families who changed from GHC to UHC reported "most important" reasons for switching that were different from BC. Twenty-eight percent of these families named "pro-UHC" provider-related reasons as the primary ones in their decision to switch. Twenty-two percent reported that UHC's overall coverage was the main reason. It is also noteworthy that 19 percent of these families mentioned maternity care as the most important reason for switching: 9 percent reported that UHC's maternity benefits were their major reasons for switching and 11 percent reported switching due to dissatisfaction with GHC's maternity benefits. This may in part be reflected in the slightly higher proportion of 20- to 39-year-old female subscribers in the GHC switcher population. In any event, the proportion of families citing maternity coverage or care as the "most important reason" illustrates the sensitivity of the group at risk to differences among plans. It will be recalled from Chapter II that the copayment for normal delivery was quite similar across plans in 1978-79 (BC-$600; GHC-$473; UHC-$500). Four percent of GHC switchers gave "GHC-negative" provider-related reasons for switching, and only 5 percent of the group mentioned UHC's coverage of preventive care as a major reason (contrasted with the 51 percent of BC switchers noted above).

To summarize, reasons reported for changing or not changing to UHC focused on: (1) the presence or absence of coverage of preventive health care (the most frequent topic of response); (2) other financial aspects of the plans (presence of copayment and deductibles); and (3) provider-related reasons, namely presence of a doctor in the plan, provider recommendations or desire for a primary care physician (PCP). Special features of coverage, such as mental health care coverage, prescription coverage and covered physical exams did not surface as significant in the decision process.

With regard to sources of information, the employer provided the majority of information on the available plans. A greater proportion of BC switchers discussed the plans at work, while a greater proportion of GHC switchers discussed the plans at home. Almost all subscribers and the majority of spouses reviewed the information about the new plan and the level of satisfaction with the information was high among all groups.

Having looked at reasons given by switchers for their decisions, we next examine choice of UHC as an alternative to BC or GHC, using the entire sample of switchers and nonswitchers. In the following sections we will present the results of the multivariate analysis.

Independent Variables

Table V-4 presents the definitions and means of all variables used in the identification of the four explanatory factors. Significant differences between switchers and nonswitchers are indicated. It should be noted that these differences are zero-order differences, not controlling for other potentially confounding variables.

Zero-order correlations were examined between all variables within each factor for the BC and GHC groups and are

TABLE V-4
EXPLANATORY FACTORS:
GROUP MEANS FOR COMPONENT VARIABLES* OF NEED FOR CARE

Variable Name	Group			
	BC	BC-UHC	GHC	GHC-UHC
Family life stage (FAMSCL)	4.58[ʃ]	5.04	4.69[†]	4.54
Family age (FAMAGE)	38.29[†]	36.28	32.58	31.64
Health status: Family average (FMHLST) (1 = excellent → 4 = poor)	1.59	1.62	1.57	1.60
Health status: Least healthy person (HHLST) (1 = excellent → 4 = poor)	1.76	1.81	1.75	1.80
Number of chronic conditions: Family average (AVCHRC)	1.33	1.37	1.29	1.29
Number of chronic conditions: Least healthy person (HCHRN)	1.83	1.86	1.79	1.81
Conditions under care: Family average (NMCARE)	1.39	1.63	1.57	1.18
Conditions under care: Least healthy person (HICARE)	1.08	1.14	1.05	1.17
Mental health: Least healthy adult (HMMOD) (1 healthy → 7 unhealthy)	2.19	2.26	2.28	2.43
Highest on Positive Feeling Scale (HPOSF)	10.48	10.46	10.38	10.39
Lowest on Positive Feeling Scale (LPOSF)	9.68	9.60	9.56	9.65
(For both positive scales: 3 unhealthy → 12 healthy)				
Highest on Negative Feeling Scale (HNEGF)	11.45	11.67	11.72	12.20
Lowest on Negative Feeling Scale (LNEGF)	9.90	10.20	10.39[†]	11.00
(For both negative scales: 6 healthy →24 unhealthy)				
Subscriber's education in years (SBEDUC)	15.99[†]	15.51	15.79[§]	14.79

*Significance of test for difference (t or x^2): † $p < .05$
ʃ $p < .01$
§ $p < .001$

TABLE V-4 (continued)
NEED FOR CARE

Variable Name	Group			
	BC	BC-UHC	GHC	GHC-UHC
Average adult's education (CEDC)	15.66	15.36	15.63§	14.69
Subscriber's age (SUBAGE)	44.84†	43.40	39.82	38.05
Subscriber's sex (SUBSEX) 1 = male, 2 = female	1.48†	1.57	1.49†	1.61
Subscribers race (SBRACE) 1 = white 2-4 = non-white	1.20	1.28	1.40	1.33
Under medical care during June 1978 (UNDMD) (0 = no, 1 = yes)	.32	.36	.29	.31

*Significance of test for difference (t or x^2): † $p < .05$
∫ $p < .01$
§ $p < .001$

TABLE V-4
EXPLANATORY FACTORS:
GROUP MEANS FOR COMPONENT VARIABLES* OF ACCESS TO CARE

Variable Name	Group			
	BC	BC-UHC	GHC	GHC-UHC
Presence of usual sources of care (usc) in family (FAMUSC) (0 = none have usc, 1 = some have usc, 2 = all have usc)	1.79	1.83	1.93	1.87
Subscriber has usual source of care (SBUSC) (0 = no, 1 = yes)	.67[†]	.77	.79	.82
Recent use of usual sources by family members (UUSCP) (0 = no usc, 1 = none used, 2 = some used, 3 = all used)	2.46[ʃ]	2.62	2.54	2.55
Subscriber has recent use of usual source (SBUSCP) (1 = no use, 2 = use)	1.67[§]	1.81	1.81[§]	1.59
Family's sources on UHC list (MFSIT) (0 - no usc, 1 = no sources on list, 2 = some sources on list, 3 = all sources on list)	1.25[§]	2.43	--	--
Average family satisfaction with usual sources (MNFMST) (1 = very satisfied → 4 = very dissatisfied)	1.15	1.18	1.34[§]	2.22
Least satisfaction reported with any usual source (HFMSAT) (1 = very satisfied → 4 = very dissatisfied)	1.31	1.35	1.59[§]	2.66
Subscriber's satisfaction with usual source (SBSTPR) (1 = very satisfied → 4 = very dissatisfied)	1.24	1.29	1.49[§]	2.54
Appointment acquisition time--family average (AVQ36) (days)	9.43[†]	6.98	11.22	12.35
Appointment acquisition time--highest reported by a family member (HQ36) (days)	11.93[†]	9.34	13.65	15.51

*Significance of test for difference (t or x^2): † $p < .05$
ʃ $p < .01$
§ $p < .001$

TABLE V-4 (continued)
ACCESS TO CARE

Variable Name	Group			
	BC	BC-UHC	GHC	GHC-UHC
Travel time to appointments--family average (AVQ37) (minutes)	18.34	17.01	20.28	21.66
Travel time to appointment--highest reported by a family member (HQ37) (minutes)	20.89	19.36	22.24	23.90
Waiting time in office--family average (AVQ38) (minutes)	22.74	24.12	19.65§	35.15
Waiting time in office --highest reported by a family member (HQ38) (minutes)	25.97	28.22	21.91§	40.49

*Significance of test for difference (t or x^2): † $p < .05$
∫ $p < .01$
§ $p < .001$

TABLE V-4
EXPLANATORY FACTORS: GROUP MEANS FOR COMPONENT VARIABLES* OF FINANCIAL CAPABILITY

Variable Name	BC	BC-UHC	GHC	GHC-UHC
	Group			
Gross family income (INCM) (01=lowest category → 12=highest [$44,000+])	$7.05^{\dagger}$	6.35	5.91	5.70
Per capita income (FMINCM) (01=lowest category → 12=highest [$44,000+])	$3.76^{\int}$	3.39	3.32	3.28
Subscriber's occupation (SBOCP) (1 = prof., manag.; 2 = non)	$1.39^{\dagger}$	1.46	$1.39^{\S}$	1.59
Subscriber's education (SBEDUC) (years)	$15.99^{\dagger}$	15.51	$15.79^{\S}$	14.79
Average education of subscriber and spouse (CEDC) (years)	15.65	15.36	$15.63^{\S}$	14.69
Subscriber's sex (SUBSEX) (1 = male, 2 = female)	$1.49^{\dagger}$	1.57	$1.49^{\dagger}$	1.61
Subscriber's age (SUBAGE)	$44.84^{\dagger}$	43.41	39.82	38.05
Subscriber's race (SBRACE) (1 = white, 2-5 = non-white)	1.20	1.28	1.40	1.33
Other health insurance coverage for subscriber July 1977-July 1978 (INS78) (1 = yes, 0 = no)	$.32^{\dagger}$	.26	.20	.27
Number of other policies in family (controlled for eligible family members)				
July 1975 - June 1976 (OTR76)	.48	.41	$.33^{\int}$	.49
July 1976 - June 1977 (OTR77)	.43	.38	$.28^{\dagger}$	.39
July 1977 - June 1978 (OTR78)	.41	.35	$.25^{\int}$	.37
Sum of policies 3 years (SMOTR)	1.32	1.14	$.86^{\int}$	1.24

*Significance of test for difference (t or x^2): † p < .05
∫ p < .01
§ p < .001

TABLE V-4 (continued)
FINANCIAL CAPABILITY

Variable Name	Group			
	BC	BC-UHC	GHC	GHC-UHC
Sum of mean number of other policies in family July 1975-June 1978 while a state employee (SCOTH)	.90	.75	.51	.69
Number of subscriber's other policies July 1975-June 1978 regardless of employment (BOTHIS)	1.12	.95	.76	1.07

*Significance of test for difference (t or x^2): † $p < .05$
∫ $p < .01$
§ $p < .001$

TABLE V-4
EXPLANATORY FACTORS:
GROUP MEANS FOR COMPONENT VARIABLES* OF EXPERIENCE WITH PLAN

Variable Name	Group			
	BC	BC-UHC	GHC	GHC-UHC
Months of state employment July 1977-July 1978 (BSTPLI)	11.69	11.69	11.54	11.27
Total months of state employment July 1975 to July 1978 (BSTPL)	31.82†	32.95	30.66	28.83
Months of state BC coverage July 1977-July 1978 (MB78)	11.63	11.57	.05	.00
Months of state BC coverage July 1975-July 1978 (SMMB)	30.09	30.65	1.36§	4.56
Months of state GHC coverage July 1977-July 1978 (MG78)	.02	.00	11.48	11.15
Months of state GHC coverage July 1975-July 1978 (SMMG)	.49ʃ	1.18	28.89§	23.16
Months of BC coverage from any source controlled for employment July 1977-July 1978 (OTSB78)	11.69	11.67	.65	1.02
Months of BC coverage from any source controlled for employment July 1975-July 1978 (SOTSB)	30.53	31.05	2.68§	6.04
Months of GHC coverage from any source controlled for employment July 1977-July 1978 (OTSG78)	.50	.298	11.60†	11.23
Months of GHC coverage from any source controlled for employment July 1975-July 1978 (SOTSG)	1.50	1.70	29.15§	23.60
Months of BC coverage from any source not controlled for employment July 1975-July 1978 (SOTNNB)	31.26	31.79	3.29§	7.41

*Significance of test for difference (t or x^2): † p < .05
ʃ p < .01
§ p < .001

TABLE V-4 (continued)
EXPERIENCE WITH PLAN

Variable Name	Group			
	BC	BC-UHC	GHC	GHC-UHC
Months of GHC coverage from any source no controlled for employment July 1975-July 1978 (SOTNNG)	1.74	1.76	29.81§	24.03
Report of problems with plan administration (SATPL2) (0 = no, 1 = yes)	.28§	.47	.06	.04
Report of problems with providers while covered by plan (SATPL3) (0 = no, 1 = yes)	.07	.07	.17§	.34
Out-of-pocket costs reported for January-June 1978 (COST)	121.49	128.78	22.54§	51.01
Costs as percent of income (COSTIN) (Income = 01-12)	19.29	21.46	3.80†	9.57
Satisfaction with out-of-pocket costs (Q68) (1 = satisfied → 3 = dissatisfied)	1.41†	1.80	1.16	1.23
Changed plans between July 1975-July 1978 (CHANGE) (0 = no, 1 = yes)	.06	.10	.10§	.31
Average family total utilization for six months prior to switching (January 1978 - June 1978) (FTOT2)	167.35	134.07	142.90	84.03

*Significance of test for difference (t or x^2):
† p < .05
∫ p < .01
§ p < .001

presented in Volume II, Appendix V.2. Since several measures of some variables were being tested in this study, many of these correlations were statistically significant. It was decided to rely on the multivariate techniques for data reduction rather than to eliminate variables arbitrarily at this stage because of multi-collinearity.

The variables chosen were not highly collinear, but cross-tabulations and accompanying tests of association on the variables revealed association and potential interaction. All possible pairs of variables were then systematically tested for significance of possible interaction in predicting switching. Only first order interactions were tested due to the complexities in interpretations of higher order interactions and their limited usefulness in research of this type. Either two-way analysis of variance (ANOVA) or stepwise regression was used to test the significance of the main effects and interactions, depending on the number of categories required in the analysis. A p value $< .05$ was considered necessary to warrant retaining variables for subsequent analysis.

Factors Influencing Choice

Examination of the set of variables for each explanatory factor for both BC and GHC reveals the differing characteristics of the population groups in the study and differing assessments of the expected utilities of switching to UHC. Tables V-5 and V-6 present the results of the stepwise discriminant analysis for BC and GHC respectively. The canonical coefficients can be interpreted as the relative contribution of each measure to the discriminant function. The direction of the relationship between the measure and switching to UHC is reflected in the sign of the coefficient.

The need for care set of variables included a family's life stage, mental and physical health status, and whether anyone in the family was under medical care during the 1978 open enrollment period.* In addition, subscriber's age, sex, race and education were tested in this set (as well as in the financial set) to evaluate their contribution to the subjective assessments of need.

The family life stage measure consisted of a ranking from one to ten, which represented increasing risk of the need for care. It was constructed from family information on marital status, age of subscriber, presence of children and age of the youngest child. Families with single subscriber and young children were considered to be at higher-risk than families with married subscribers and young children. The BC and GHC groups were at approximately the same stage of the life cycle; however, bivariate analysis of the measure reveals that GHC families at a lower-risk life stage are more likely to switch to UHC while BC families at a higher-risk life stage are more likely to switch (Table V-4). The family life stage measure was not significant for the GHC estimation but did contribute to the BC estimation (Table V-5).

With respect to the physician health status variables, a substantial majority of families reported good or excellent health, and less than two chronic conditions (family average). Values for these measures were very similar between the BC and GHC groups. The physical health status measures did not appear to affect the change-of-plan decision.

Mental health status as measured by a scale based on the frequency of certain positive and negative feelings was the only health status measure which proved significant both in the bivariate analysis (Table V-4) and in the multivariate analysis (Table V-6). It was significantly related to choice of plan only for the GHC switchers and nonswitchers. The

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*An explanatory facet of the study led us to examine several family measures for each concept, the intent being to determine whether any one of the measurements of the average, most extreme, or the subscriber's characteristics was a stronger predictor of the switching decision than the others. For example, in the need for care set, physical health measurement involved average family health status as measured by the health perception question, health perception of the least healthy family member, average number of chronic conditions in a family, number of chronic conditions of the least healthy member, family's average number of chronic conditions for which care was received during 1977-78 and number of conditions under care for the least healthy member. Mental health measurement involved the highest and lowest values on the positive and negative components of the mental health scale as well as the mental health states of the least mentally healthy adult in the family. This approach to measuring family characteristics did not prove to be particularly fruitful when compared to the simple use of family mean values.

TABLE V-5

BC DISCRIMINANT ANALYSIS RESULTS

NEED FOR CARE

Standardized Canonical Discriminant Function Coefficients

Characteristic	Coefficients
Subscriber's age	-.5377
Under medical care during June, 1978	.4067
Family life stage	.7365

Classification Results (Percent)*

	Predicted Group	
Actual Group	Nonswitchers	Switchers
Nonswitchers	58.8	41.2
Switchers	49.5	50.5

Correctly Classified: 55.3
R^2 =.014
d.f. = 950

ACCESS TO CARE

Standardized Canonical Discriminant Function Coefficients

Characteristic	Coefficients
Proportion of family with usual source on UHC list	1.000

Classification Results (Percent)*

	Predicted Group	
Actual Group	Nonswitchers	Switchers
Nonswitchers	78.7	21.3
Switchers	18.2	81.8

Correctly Classified: 80.0
R^2 =.317
d.f. = 949

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*The default rule used assumed that the product of prior probabilities and the costs of misclassification cancel one another.

TABLE V-5 (continued)

FINANCIAL CAPABILITY

Standardized Canonical Discriminant Function Coefficients

Characteristic	Coefficients
Subscriber's sex	.7127
Per capita income	-.7759

Classification Results (Percent)*

Actual Group	Predicted Group Nonswitchers	Switchers
Nonswitchers	55.4	44.6
Switchers	43.2	56.8

Correctly Classified: 56.0
R^2 =.016
d.f. = 938

EXPERIENCE WITH PLAN

Standardized Canonical Discriminant Function Coefficients

Characteristic	Coefficients
Months of BC coverage July 1977-June 1978	-.3840
Satisfaction with out-of-pocket costs	.6905
Report of problems with plan administration	.4676
Length of state employment July 1975-1978	.3885
Number of switches in state plan 1975-1978	.2213

Classification Results (Percent)*

Actual Group	Predicted Group Nonswitchers	Switchers
Nonswitchers	59.1	40.9
Switchers	34.7	65.3

Correctly Classified: 61.7
R^2 =.092
d.f. = 945

TABLE V-6
GHC DISCRIMINANT ANALYSIS RESULTS

NEED FOR CARE

Standardized Canonical Discriminant Function Coefficients

Characteristic	Coefficients
Subscriber's sex	.68717
Mental health: lowest negative feelings	.70480

Classification Results (Percent)*

	Predicted Group	
Actual Group	Nonswitchers	Switchers
Nonswitchers	57.7	42.3
Switchers	46.7	53.3

Correctly Classified: 56.5
R^2 =.018
d.f. = 530

ACCESS TO CARE

Standardized Canonical Discriminant Function Coefficients

Characteristic	Coefficients
Least satisfaction with usual source	1.3379
Recent use of usual source by subscriber	-.0669
Interaction of least satisfaction with usual source and recent use of usual source by subscriber	-.4572

Classification Results (Percent)*

	Predicted Group	
Actual Group	Nonswitchers	Switchers
Nonswitchers	84.0	16.0
Switchers	34.4	65.6

Correctly Classified: 78.9
R^2 =.24
d.f. =468

TABLE V-6 (Continued)

FINANCIAL CAPABILITY

Standardized Canonical Discriminant Function Coefficients

Characteristic	Coefficients
Subscriber's age	-.32407
Subscriber's occupation	.79283
Sum of the means of other family policies 1975-78	.51932

Classification Results (Percent)*

	Predicted Group	
Actual Group	Nonswitchers	Switchers
Nonswitchers	58.5	41.5
Switchers	40.0	60.0

Correctly Classified: 58.9
R^2 =.052
d.f. = 532

EXPERIENCE WITH PLAN

Standardized Canonical Discriminant Function Coefficients

Characteristic	Coefficient
Report of problems with providers	.61725
Months of GHC coverage from any source '75-'78	-.8307

Classification Results (Percent)*

	Predicted Group	
Actual Group	Nonswitchers	Switchers
Nonswitchers	66.6	33.4
Switchers	38.7	61.3

Correctly Classified: 65.1
R^2 =.099
d.f. = 532

*The default rule used assumed that the product of prior probabilities and the costs of misclassification cancel one another.

specific measure which was found to be important was the lowest value reported by an adult for the negative feeling component of the scale. This represents the health level of the mentally healthiest adult with the lower numbers representing better mental health. Families whose most mentally healthy adult was healthy were more likely to switch from GHC to UHC; or conversely, families with adults having worse mental health were more likely to remain in GHC. It is interesting to note the mental health benefits of each of these two plans. GHC provides free of charge up to ten inpatient or outpatient mental health visits per calendar year; additional visits cost $9.50 each during the study period. UHC covers the complete costs of 30 days' hospital confinement and up to ten inpatient or outpatient psychiatric visits or treatments per calendar year. Depending on the frequency of needed outpatient visits, adults needing outpatient psychiatric care may spend less out-of-pocket at GHC. The findings may also reflect the desire to remain with the psychiatric practitioner from whom care was already being received.

When controlling for the effects of other variables, being under medical care during the 1978 open enrollment period was significantly related to switching in the BC analysis (Table V-5). It was found that those families with members under care in June 1978 were more likely to change plans. However, this factor did not appear to be a significant predictor of switching in the bivariate analysis of variables in either plan.

Still considering need for care, a subscriber's age and sex had impact on choice of plan differently for BC and GHC. GHC families with female subscribers were more likely to change to UHC. BC families with younger subscribers were more likely to change to the new plan.

Within the access to care set of variables, the family's relationships with their usual sources of care, appointment acquisition time, travel time to the provider's office and waiting time in the office were significantly related to choice. Both the average times of a family and the greatest time reported by a family member were tested. Relationships with usual sources of care were studied as to their presence or absence for all family members as well as whether the subscriber or "all, some or no" family members had recent use of the provider. In addition, the family's average satisfaction with usual source, the least satisfied member's level of satisfaction, and the subscriber's satisfaction with his or her usual sources were studied. BC switchers and nonswitchers were also asked to report whether the usual sources in the family were on the UHC list of participating physicians, thus allowing a family to continue relationships, even though changing health care plans.

Only 4.8 percent of the BC families and only 1.9 percent of the GHC families had no usual source of care for any family member. All family members had usual sources in 86 percent of the BC switcher and nonswitcher families, and in 93 percent of the GHC families. There were not, however, significant differences in source of care between switchers and nonswitchers in either of the plans. Whether the subscriber had recent use of his or her usual source was significantly different between switchers and nonswitchers in both groups: BC subscribers who switched were more likely to have had recent use, while GHC subscribers who switched were less likely to have had recent use.

All measures of satisfaction with the usual sources of care (family average, least satisfied family member and subscriber's satisfaction) appeared to play a much larger role in the GHC decision making than in the switching decision for BC enrollees. Switchers from GHC were more likely than nonswitchers to have higher dissatisfaction with usual source, regardless of how it was measured. These results need to be considered in the context of the proportion from each plan that switched to UHC. It will be recalled that only one-third as large a proportion of GHC members switched compared to BC subscribers.

Accessibility of care for BC switchers and nonswitchers was characterized differently from the GHC groups. Whether the family's usual sources appeared on the UHC's list of participating physicians was the single best accessibility measure explaining switching: the greatest proportion of family members with usual sources on the UHC list, the more likely the family will switch to UHC. This variable alone explained 31 percent of the variance in the dependent variable and allowed 80 percent of the BC cases to be correctly classified as switchers or nonswitchers.

Although they were not chosen in the stepwise analysis, there were significant differences in the various time-based accessibility measures when considered alone (Table V-4). There were significant group differences between BC switchers and nonswitchers related to appointment acquisition time, nonswitchers reporting longer acquisition time than switchers. For GHC groups, reports of waiting time in the provider's office were significantly different for switchers and nonswitchers: switchers reporting significantly longer waits than nonswitchers. Travel time was not a significant issue to any of the groups, the mean travel time being approximately twenty minutes.

Financial capability to cover the costs of care was represented by measures of income (gross family and per capita family); subscriber's occupation, education, race, age and sex (as measures of potential earning power and thus financial risk); and the extent of other health care coverage in the family, both private and state plans, both while employed by the state or not, for all family members, for each and all of the three years prior to the 1978 open enrollment.

Once again the variables which were related to choice of plan differed between the BC and GHC groups. Reported gross and per capita income were not significantly different for GHC switchers and nonswitchers; nor were they significant in the estimated equation. However, there were significant differences in both gross income and per capita income between the BC groups, with per capita income (while controlling for the other variables) clearly related to the decision to switch. Both gross and per capita incomes were less for those switching to UHC than for those remaining with BC. BC nonswitchers reported an average gross annual income of $26,000 compared to $22,500 for switchers; mean per capita income for BC nonswitchers was $12,800 compared to $11,600 for switchers.

When used in the discriminant analysis that included financial capability variables, the effects of age and sex were of different significance compared to their appearance in the need for care regressions. However, the direction of their effects was the same. Sex of subscriber made an important contribution to the BC financial capability equation, families with female subscribers being more likely to change to UHC. Subscriber's age was important to the GHC equation, with families with younger subscribers changing to the new plan.

In both BC and GHC, switching families were significantly more likely to have subscribers with non-professional, non-managerial occupations. In the GHC multivariate analysis of financial capability variables, occupation was a significant predictor.

The many measures of the existence of other health care coverage in the family pre-1978 were very difficult to construct due to the changing eligibility status of family members over time and the changing employment status of the subscriber over time. While not significant in the BC financial capability equation, differences in switching for BC enrollees depended on whether the subscriber had other health care coverage from July 1977 to June 1978. Switchers were less likely to have had other insurance coverage during this time. All measures of other insurance for BC enrollees showed similar trends: switchers being less likely to have other coverage than nonswitchers. However, the same measures tested in the GHC groups showed the opposite effects for all measures used; switchers to UHC had more policies per family than nonswitchers from GHC. The other insurance measure contributing to choice for GHC enrollees was the sum of the family's total number of policies for 1975-1978, with switchers being more likely to have had other policies than nonswitchers.

The discriminant analysis using the financial variables for both BC and GHC resulted in very small R values. In addition, the classificatory power of the sets of variables was approximately the same as the need for care variables and not as high as the access variables.

The discriminant function for experience and satisfaction with previous plans consisted of: measures of exposure to both health care plans while employed by the state or elsewhere; reports of problems with either plan administration and/or any provider while covered by the plans; reports of out-of-pocket costs for health care from January to June 1978, and satisfaction with that amount; and frequency with which a family had changed state health care plans during the time from July 1975 to June 1978 (excluding the 1978 switch). The many different measures allow investigation of many aspects of experience with plans which, as in GHC, deliver services as well as finance care. It was also important to measure past exposure to the GHC plan by BC enrollees and vice versa since willingness to enroll in a new plan with some of the similarities of BC and GHC may be influenced by even limited exposure to a variety of other plans.

This particular measure of exposure to the "other" plan (BC enrollees having experienced GHC coverage and vice versa) proved to be significantly different between switchers and nonswitchers of each plan even when length of state employment was controlled. BC switchers to UHC reported significantly greater exposure (as measured in months) to GHC than nonswitchers. The same finding existed in the GHC analysis, with GHC switchers having experienced significantly longer exposure to BC than nonswitchers. However, when included in the multivariate equation (controlling for other variables) the measures do not significantly contribute to the prediction of switching to UHC.

On the other hand, months of exposure to the plan prior to the 1978 open enrollment period proved to be significant in both the BC and GHC equations, although the variable measurement was slightly different: months of BC coverage as a state employee during the year prior to the July 1978 enrollment period was significant in the BC analysis, while months of exposure to GHC as a state employee or otherwise during the three years prior to the July 1978 open enrollment period proved significant in the GHC analysis.

It is interesting to note the differing emphasis on problems with providers reported by the GHC groups, and problems with plan administration reported by the BC groups. There were differences in reported problems with providers between GHC switchers and nonswitchers. Significantly more problems with providers were reported by switchers to UHC. Similarly, BC switchers reported significantly more problems with plan administration than nonswitchers.

While the level of reported out-of-pocket costs did not enter into either equation, there are interesting differences both between plans and within plans. BC switchers and nonswitchers reported approximately equal out-of-pocket costs for care, averaging $121 for nonswitchers and $129 for switchers. These amounts probably reflect the fact that BC has a $50 deductible per person up to three persons per family per calendar year, in addition to a ten percent coinsurance. The amounts reported were for the first half of the deductible period. In contrast, GHC nonswitchers reported an average of $22 spent during this same period for care, while switchers reported a mean of $51 for care. This is a significant ($p < .001$) difference between GHC switchers and nonswitchers which is also reflected in the measure of costs as percent of income, switchers having values slightly greater than twice that of nonswitchers. Out-of-pocket costs at GHC stem from care received outside the system or charges for eyeglasses, maternity care or mental health visits over the ten allowed per year.

The variable created to measure the freqency of a family's switching state health plans during the three years pre-1978 was found to be significant only in the BC analysis, with switchers to UHC having been more likely than BC nonswitchers to have changed state plans at least once during the preceding three years.

Comprehensive Models of Choice

In the previous section we have looked at sets of variables separately. We will now consider the model of all factors affecting switching estimated by using the variables which were the strongest predictors, within the four sets of independent variables. Table V-7 presents the combined BC discriminant analysis results. All variables of the BC model were statistically significant to at least the $p < .01$ level with the exception of the measures for plan administration problems ($p < .056$) and per capita income ($p < .059$). By far the strongest variable when other variables are held constant is the proportion of family members with usual sources of care on the UHC list. The relative size of the standardized canonical discriminant function coefficient indicates its importance to the model. As indicated by the earlier estimation, families of younger female subscribers were more likely to switch, as were families with lower per capita incomes. This may be an indication of the higher health risk as well as economic vulnerability described by previous research. The absence of a deductible in a plan which allows maintenance of usual providers could be especially appealing to young families and single-parent families.

TABLE V-7
BC COMBINED DISCRIMINANT ANALYSIS RESULTS

Standardized Canonical Discriminant Function Coefficients

Characteristic	Coefficients	p ≤
NEED		
Subscriber's age (SUBAGE)	-.2013	.001
Under medical care during June 1978 (UNDMD)	-.1397	.007
ACCESS		
Proportion of family with usual source of care on UHC list (MFSIT)	.9229	.001
EXPERIENCE		
Months of BC coverage July 1977-June 1978 (MB78)	-.1877	.003
Satisfaction with out-of-pocket costs (Q68)	.2385	.001
Report of problems with plan administration (SATPL2)	.1044	.056
Length of state employment July 1975-June 1978 (BSTPL)	.1545	.012
Number of switches in state plan 1975-1978 (CHANGE)	.1285	.009
FINANCIAL		
Subscriber's sex (SUBSEX)	.1436	.006
Per capita income (FMINCM)	-.0892	.059

Classification Results (Percent)*

	Predicted Group	
Actual Group	Nonswitchers	Switchers
Nonswitchers	80.6	19.4
Switchers	19.9	80.1

Correctly Classified: 80.39
Wilk's Lambda = .6292
Chi-Square = 421.87
Significance = <.001
R^2 = .369

*The default rule used assumed that the product of prior probabilities and the costs of misclassification cancel one another.

The less exposure to the BC plan during the year before the switch, the more likely a family would switch to UHC. This may reflect an unwillingness to learn a new system once another has been mastered. But the direction of the coefficient on the variable, length of state employment, confuses the issue: the longer one worked for the state, the more likely the family would switch to the new plan. While no two-way interaction was found, some higher order interaction which has not been identified may exist.

When analyzed within the need equation (Table V-5), being under medical care during open enrollment was more likely in BC switchers than nonswitchers. When we also control for variables in the other variable sets, the direction of the effect changes (Table V-7). Those families with a member under care during the decision period were less likely to change to UHC. This finding is difficult to explain since it is not known (1) who in the family was under care; (2) whether the person's usual source was a primary care provider or a specialist; or, (3) if the provider was a primary care practitioner, whether the physician was on the UHC list. One could speculate that if the care was from a specialist, the decision-maker was concerned that a PCP would not approve its continuance. The result may also simply be spurious, since it will be recalled that there was no significant difference between switchers and nonswitchers in either plan in the bivariate results (Table V-4).

Those families reporting dissatisfaction with out-of-pocket costs and plan administration were more likely to change to the new plan. Concern about costs is consistent with the fact that lower-income families changed plans. The "paperwork" involved in filing claims for reimbursement as well as the delays in reimbursement are common complaints of dissatisfied enrollees in traditional indemnity plans, including BC.

The model shown in Table V-7 explained 36.9 percent of the variance in the dependent variable, and the chi-square and Wilks' Lambda were highly significant. The final set of variables classified switchers and nonswitchers equally accurately, and correctly classfied 80.39 percent of the BC cases.

Table V-8 presents the GHC final discriminant analysis estimates. The estimates for the GHC model once again revealed an access variable as the strongest predictor of switching when all other variables are controlled in the equation. The less satisfied any family member was with his or her usual provider, the more likely it was that the family switched to UHC. The other two accessibility measures, recent use of usual source of care by the subscriber and the interaction of recent use and lowest family satisfaction with provider did not contribute significantly to the equation.

TABLE V-8
GHC COMBINED DISCRIMINANT ANALYSIS RESULTS

Standardized Canonical Discriminant Function Coefficients

Characteristic	Coefficients	p ≤
NEED		
Subscriber's sex (SUBSEX)	.1371	.063
Mental health: Lowest Negative Feelings (LNEGF)	.0886	.170
ACCESS		
Least satisfaction with usual source (HFMSAT)	1.0558	.001
Recent use of usual source by subscriber (SBUSCP)	-.0664	.360
Interaction of HFMSAT and SBUSCP (HFMSCP)	-.3599	.150
EXPERIENCE		
Report of problems with provider (SATPL3)	.1992	.020
Months of GHC coverage from any source 1975-1978 (SOTNNG)	-.3443	.001
FINANCIAL		
Subscriber's age (SUBAGE)	.1823	.028
Subscriber's occupation (SBOCP)	.2631	.001
Sum of the means of other family policies 1975-1978 (SMOTR)	.1098	.120

Classification Results (Percent)*

	Predicted Group	
Actual Group	Nonswitchers	Switchers
Nonswitchers	83.8	16.2
Switchers	30.0	70.0

Correctly Classified: 79.91
Wilks' Lambda = .7027
Chi-Square = 160.91
Significance = <.001
R^2 = .297

*The default rule used assumed that the product of prior probabilities and the costs of misclassification cancel one another.

Subscribers who switched from GHC were more likely to be female, as were the BC switchers. When all other variables are in the equation, the direction of the effect of subscriber's age on the equation changes from the earlier result: families with older subscribers were more likely to change to UHC than to remain with GHC.

Subscriber's occupation was significant in the equation; subscribers with professional and managerial occupations were more likely to remain with GHC than were other occupational groups. The discriminant function coefficient revealed the relatively high importance of the variable to the switching decision.

The experience with plan variables, satisfaction with providers and length of exposure to GHC, were both significant when the effects of the other variables were held constant. Families with less exposure to the GHC plan but higher dissatisfaction with providers while covered were more likely to change to UHC.

This set of measures explains 29.7 percent of the variance in switching plans. The results are clearly significant as evidenced by the Wilks' Lambda and chi-square values. Nonswitchers were classified much more accurately than switchers (83.8 percent versus 70 percent); the variables correctly classified 79.91 percent of all GHC cases.*

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*To determine the generalizability of the two switching rules developed, we applied the GHC rule to the BC data and vice-versa to see how well each rule would perform in predicting switching in the other provider system.

Since some of the variables in the rules were specific to the plans, we deleted such variables and recreated the rules with the remaining variables. For GHC, this left a rule based on the following variables:

SATPL3 SUBSEX SUBAGE SUBOCP LNEGF SBUSCP HFMSAT SMOTR
HFMSCP FTOTIN2 FTOTOU2

For BC the rule was based on the variables:

UNDMD SATPL2 SUBSEX SUBAGE FMINCM CHANGE BSTPL 068
FAMSIZ FTOTIN2 FTOTOU2

When the BC rule is applied to the GHC families, a cutoff of +60 (which gives 80 percent sensitivity [switchers correctly predicted] and 40 percent specificity [nonswitchers correctly predicted] for the BC families) gives 62 percent sensitivity and 52 percent specificity; if the cutoff were moved to +99, the rule would have 80 percent sensitivity and 29 percent specificity. There is a reasonable amount of separation between the switchers and the nonswitchers. Thus, the BC rule can be said to generalize to quite a different setting (the prepaid group practice), although the amount of separation between switchers and nonswitchers in the new setting is not large.

When the GHC rule is applied to the BC families, however, there is effectively no separation between the BC switchers and the BC nonswitchers. Thus, the GHC rule does not seem at all applicable to the BC family data.

This suggests that there are general reasons for switching as exemplified by the BC rule, as well as plan-specific rules exemplified by the GHC case.

The Effect of Prior Utilization

The preceding choice-of-plan analysis is based on data collected by household interview. Extensive information was obtained on the health status of each family member during the period before the decision to switch to UHC or remain with an existing plan. It is evident from the preceding analyses that health status, either of the sickest family member or on family average, is not a consequential factor in the choice of plans. The only one of the several components of health status to be at all correlated with switching was a dimension of mental health for GHC families. It will be recalled that there was some tendency for families with members having positive health status to switch to UHC.

A far more common approach to assessing the role of health status in plan selection, particularly from the perspective of the insurance industry, is to evaluate actual utilization behavior of potential switchers. Prior utilization can be viewed as a composite measure of health status on one hand and tendency to use health services on the other.

In the present study, extensive data were retrieved from BC claims files and from GHC medical records for the six-month period prior to the introduction of UHC (January, 1978 through June, 1978). The data collection methods, coding and weighting procedures used are described in Chapter VI. The variables used in the present analysis were constructed by weighting each procedure or other element of utilization (e.g., a visit or hospital admission) by the California Relative Value Scale (CRVS) weight. CRVS units were themselves weighted on the basis of actual BC charges for care for the study sample. The purpose of this weighting procedure was to allow aggregation of utilization in a way that reflected volume and content of services expressed as imputed dollars. Referring to this as standardized volume of use, it does not measure the cost of care in either BC or GHC, but can be thought of as what the plans would have been billed for equivalent services. (Details of the weighting procedure are given in Volume II, Appendix VI.5.) For any particular service, for example, GHC may actually have higher or lower unit costs. This measure allows comparison of use of services across plans. Standardized volume is categorized by inpatient and outpatient services: medical, surgical, laboratory and radiology services, and hospital visits.

To determine possible selection biases, adverse or favorable, of those switching from either GHC or BC to UHC, utilization variables were added in stepwise fashion to regression equations with specifications derived from the discriminant functions shown in Tables V-7 and V-8. For this analysis of utilization data families with double coverage (that is, two family members who were state employees) were omitted because of the difficulty of determining which subscriber's plan was used to cover a particular service, and because of possible duplication of claims. A total of 29 families were omitted resulting in a new sample size of 1,468 families.

After entering the choice-of-plan variables indicated in Tables V-7 and V-8, the utilization variables were allowed to enter in the second step. In addition, six sociodemographic variables drawn from an earlier comparative study of the same plans (Richardson, et al. 1980) were included with the utilization variables.* Variables were entered* Variables were entered if the F-in was significant at $p \leq .05$ and were deleted if the F-out was significant at $p \geq .10$.

For both the BC and GHC samples, the analysis used as utilization variables the 12 family average measures encompassing inpatient and outpatient services separately: total use; medical use; laboratory use; radiology use; surgery use; and hospital-related physician visits. The remaining three utilization variables were: family average total hospital visits ; family average total surgery use; family average total use.

Considering first the BC analysis, three variables entered the equation: family size, total outpatient use and total hospital visits. Larger families were more likely to switch from BC to UHC. The effects of the utilization variables, however, were mixed. Lower total outpatient use was associated with switching, while the reverse was true for total hospital visits. The contribution of either or both of these variables to predicting switching, however, was negligible. For example, the total variance explained (R) for the equation as specified in the earlier section (Table V-7) was approximately .37. The change in R as a result of adding the two utilization variables was .008.

Finally, with reference to BC, the contribution of average family total prior standardized volume of use alone, as well as controlling for the variables shown in Table V-7, was considered. The simple regression of switching on average total prior utilization yielded a negative coefficient, but an R of .002 and p = .195, indicating no statistically significant relationship. At the same time, mean values of family total standardized volume of the six-month period prior to open enrollment were $167 versus $134. When averaged family total prior utilization was forced into the basic equation (Table V-7), the increase in R was negligible (R = .002). The variable was not statistically significant (p =

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*These variables were: subscriber's race; self-reported health status of sickest family member; family average self-reported health status; family size; age of subscriber squared; and age x sex of subscriber.

.085), but the relationship between total utilization and switching to UHC was again negative. That is, if UHC experienced any selection, it was favorable as reflected in the mean values shown above.

Turning to GHC, only family average total surgery use entered the basic equation (from Table V-8). The increase in R was .007 on a total explained variance of approximately .30. The relationship between surgical utilization prior to open enrollment and the decision to switch to UHC was negative. That is, as in the BC analysis, UHC experienced favorable selection. Again in the GHC analysis, we considered total prior utilization alone as well as controlling for the variables from Table V-8.

No statistically significant relationship was found between switching to UHC and total prior utilization (p = .20 for BC and GHC enrollees. The GHC values of average family total standardized volume of use, however, for the six-month period prior to the enrollment change opportunity were $143 for GHC nonswitchers, and $84 for those who subsequently switched. These means suggest favorable selection into UHC; however, the variability (standard error) is large; thus, there is no statistically significant difference observed.

We conclude then that evaluation of actual utilization behavior of potential switchers during the six-month period preceding choice of plan shows no adverse selection into UHC from either BC or GHC. This result is certainly consistent with the absence of a relationship between the health status measures and switching reported in the earlier sections of this chapter. The data rather suggest a degree of favorable selection into UHC.

DISCUSSION

Because the two groups were analyzed separately, we can discuss factors affecting the group of switchers as a whole only informally. Similarly, only a general comparison of BC and GHC results is possible. Nonetheless, there are certain similarities and differences noted throughout the study.

The less time a family has been exposed to either BC or GHC, the more likely it is to leave that plan and try UHC. Families who have had a plan for a long time may feel comfortable with the workings of their plan and believe that the costs involved in making the change outweigh the benefits.

Families with female subscribers are more likely to change to UHC. This may reflect the dissatisfaction some women feel with health care in general and may be an attempt to find a "better" system. In terms of benefits to women, UHC is the only one of the three plans which covered the complete costs of voluntary sterilization, contraceptive devices and spontaneous or elective abortions. While the utilization data showed no evidence of adverse selection into UHC overall, specific areas such as these may have attracted a disproportionate number of potential users of these services.

Family life stage and health status, two measures found significant in other enrollment settings reported in the literature, were not important predictors of the switching decision in this population. This does not rule out the hypotheses related to health risk or adverse selection into group practice plans but only suggests that for those who have experience with another plan, the issue may not be health needs of the family but rather issues of accessibility and satisfaction with the plan.

The importance to these families of satisfaction--with plan administration, providers and costs--was striking in its significance to the decision and in the differing emphasis placed on it by switchers from BC versus those from GHC. Perhaps due to the fact that BC enrollees could maintain a satisfactory relationship with their provider even if they switched, reports of dissatisfaction with plan administration was much more common from BC enrollees than from GHC enrollees and much more common from BC switchers than nonswitchers. In contrast, perhaps due to the fact that GHC enrollees see plan administration _as_ delivery of services, complaints about providers while covered by GHC were much more common among GHC switchers than nonswitchers.

The phenomenon of the usual provider, traditional in the American medical system, appears to maintain its importance to these groups of enrollees. The major predictor of switching in the BC sample was presence of the family's usual sources on the UHC list. The single most important predictor of switching from GHC was degree of dissatisfaction with the family's usual source of care.

There have been very few studies that have used multivariate techniques to analyze the decision to change plans. Thus, there are only a few studies with which these results can be compared; however, these studies have been thorough and well documented: the work done by Berki, et al. (1978), by Ashcraft (1978), and by Scitovsky, et al. (1978). Although study designs are similar, it should be noted that there were premium differentials in the setting studied by Scitovsky, et al., and all studies dealt with enrollees who may or may not have had experience with another plan.

The study by Berki, et al. is the only one of the three studies amenable to comparison to this BC switcher/nonswitcher analysis. In the BC analysis, the major predictor of changing to UHC was having the usual sources of care on the UHC list. In the analysis by Berki, et al., usual source of care (in this case, type of provider) was not significant in the

BC/open panel plan decision. Berki, et al. also found family life stage to be a critical predictor in this decision; however, family life stage was not significant in this estimation; only subscriber's age (a component of family life stage) lent support to their findings. BC switchers were found in this research to be younger, consistent with Berki's finding that the younger family stages were more likely to choose the open-panel plan.

One other significant difference between the results of this research and that of Berki, et al. is the lack of support in our findings for both the health risk and financial risk hypotheses. These factors did not appear to influence enrollees to switch to the more comprehensive open-panel plan. Contrary to these findings, Berki, et al. found higher numbers of chronic conditions and higher per capita incomes in such switchers, thus supporting both hypotheses.

Some components of all three studies are applicable to comparison with the results of the GHC analysis. In the GHC analysis, findings consistent with Scitovsky's were found with regard to switchers having had less time with their former plans and lack of support for the health risk hypothesis. Unlike the lack of association for GHC found in this study, Berki, et al., Ashcraft, and Scitovsky, et al. all found support for the financial risk hypothesis insofar as switchers were found to have higher gross family incomes (Scitovsky) or higher per capita incomes (Berki, et al. and Ashcraft). Again, however, no support for the health risk hypothesis was found in this research or in the research of these other authors.

In conclusion, while families from BC and GHC differ sociodemographically and have had experience with divergent systems of financing and delivering health care, the observed preference for a primary care network plan was apparently affected by similar considerations related mainly to accessibility to care. For BC switchers, changing to UHC was seen as having greater expected utility to the decision maker than remaining with BC by virtue of the opportunity to maintain the family's relationships with their usual providers, without the expense of deductibles and coinsurance. For GHC switchers, the new plan most likely represented the greater expected utility in the opportunity it provided for family members to leave unsatisfactory relationships with providers and seek new relationships without monetary penalty.

CHAPTER VI

COMPARATIVE UTILIZATION*

INTRODUCTION

Competition among health care plans is often identified as a potential method of natural regulation in the health care market. Government officials and employers are encouraging the development of alternative health care delivery systems with the hope that these new systems will contain costs. However, evaluation of the implementation and cost of new health care plans has been limited. This study focuses on comparisons among three health care plans offered to Washington State employees in King County in July 1978 and December 1979. This evaluation provides the opportunity to examine rigorously alternative approaches to health care coverage and determine the potential of each plan for controlling the use and costs of services.

Figure VI-1 shows the plans offered to Washington State employees during the years of our study. In 1977 state employees were offered a dual choice between a comprehensive fee-for-service plan, Blue Cross of Washington and Alaska (BC), and a closed-panel health maintenance organization, Group Health Cooperative of Puget Sound (GHC). In July 1978 there was an open enrollment in which United Healthcare (UHC) was offered for the first time along with the other two plans. We were interested in studying the use and costs of health services for Washington State employees who remained with BC or GHC and employees who switched to UHC. Data were collected for 1978 and 1979.

The comparative utilization study has six major objectives:

1. Examine characteristics of individuals across plans;
2. Document different patterns of use and charges across health plans;
3. Compare use before and after the 1978 open enrollment;
4. Evaluate the effectiveness of the three types of plans in controlling use of services;

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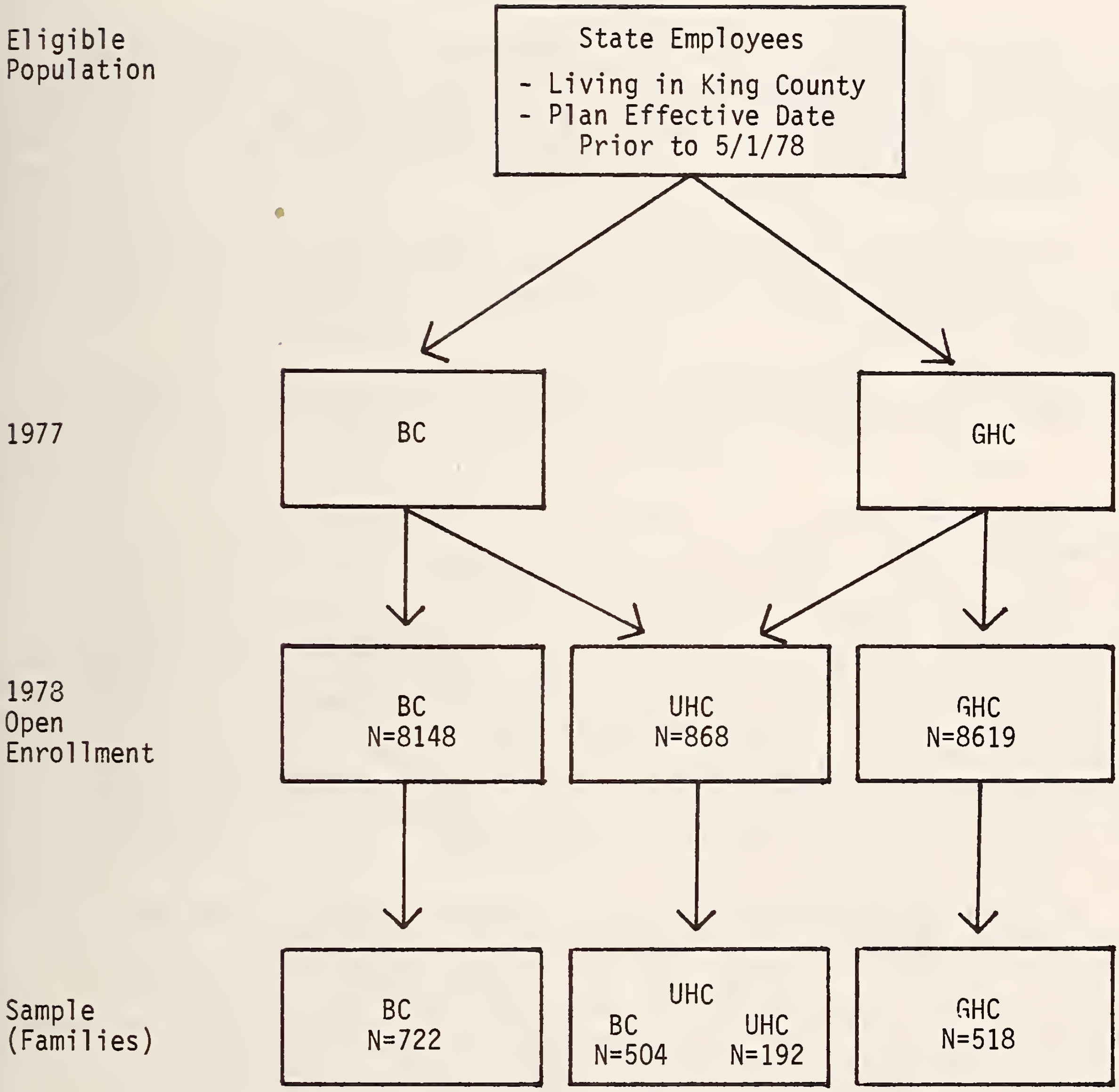

FIGURE VI-1
PLANS OFFERED TO WASHINGTON STATE EMPLOYEES

5. Determine the correlates of use and test a general model of health services use;

6. Determine the best model to explain use in each plan.

Description of Insurance Plans

The three plans offered to Washington State employees in 1978 provided similar comprehensive health care coverage and premiums for state employees and all family members were fully paid by the employer.* However the plans differed in organizational and financial structure and potential out-of-pocket costs for the enrollees.

As described in Chapter III, UHC was organized by the SAFECO Insurance Company as a primary care network model to encourage primary care physicians (PCPs) in private practice to become financial as well as medical managers of their patients' care. UHC was an innovative plan combining the advantages of a comprehensive prepaid group practice plan with those of a comprehensive fee-for-service independent practice plan.

The plan attempted to change the financial practice arrangements of the PCPs, but not their practice settings. PCPs were expected to act as gatekeepers in controlling the use and costs of services and shared with UHC financial risk for enrollees' care. When an enrollee chose UHC, he or she was required to choose a PCP who was responsible for coordinating all primary care, referrals to specialists and hospitalizations. If the enrollee received care from a specialist without approval from the PCP, UHC would not pay the claim and the enrollee was responsible for payment. In 1978 copayments of $2.00 for each prescription and $25.00 for each general physical exam were required.

BC is a comprehensive fee-for-service health care plan which covers hospital and ambulatory care including prescription drugs. Enrollees are reimbursed on a usual and customary rate (UCR) basis for services received from any physician or facility in the community. In 1978 a $50 deductible per person ($150 per family) and 10 percent coinsurance on the first $1,950 per person per year were required.

GHC is a non-profit, consumer-owned, closed-panel prepaid group practice. It has been in existence since 1947 and presently has an enrollment of over 285,000 people. Enrollees are covered only for services received in GHC facilities or approved by the staff. In 1978 there was a $1.50 copayment for each prescription and no deductible. (More details regarding the three plans are presented in Chapters II and III.)

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*In 1979, premiums for BC and UHC were fully paid by the state. However, rate changes resulted in a $1.60 monthly payroll deduction for each GHC subscriber regardless of family size.

PRIOR STUDIES

Researchers have explored the differential impact of prepaid and fee-for-service plans on the use and cost of health services for over 25 years. Prepaid group practice plans range from the closed-panel health maintenance organization (HMO) in which participating physicians are salaried and facilities are owned and operated by the plan to independent practice associations (IPAs) in which the plan contracts with physicians who maintain their individual practices and are generally reimbursed on a fee-for-service basis from the plan.

A brief review of the literature regarding the effect of traditional fee-for-service plans, closed-panel HMOs and IPAs on the use and cost of services is discussed below. The effect of the plan on hospital use, ambulatory use, in-plan cost and out-of-pocket cost is examined.

Hospital Use

Most research regarding plan effect on hospital use has demonstrated that HMOs have lower hospital admission rates and fewer hospital days per 1,000 enrollees than fee-for-service plans (Densen et al., 1958; Anderson and Sheatsley, 1959; Densen et al., 1960; United Steelworkers, 1960; Chamberlain, 1967; Perrott, 1975; Robertson, 1972; Hastings et al., 1973; Perkoff et al., 1974; Riedel et al., 1975; Wersinger et al., 1976; Richardson et al., 1980; Sorensen et al., 1981). The apparent overwhelming support for the above conclusion is tempered by consideration of sociodemographic characteristics of the groups compared and some contradictory findings from other studies. Richardson et al. (1976) recognized that in many of the earlier studies (United Steelworkers, 1960; Chamberlain, 1967; Perrott, 1975; Robertson, 1972) HMO enrollees represented populations generally associated with lower hospitalization rates. Also in these studies fee-for-service coverage for outpatient services was substantially less comprehensive than for inpatient services; therefore, hospital services may have been substituted as an alternative to outpatient care thus inflating fee-for-service hospitalization rates. Other studies have shown no difference in hospital use between HMOs and fee-for-service plans (Densen et al., 1962; Williams et al., 1964; Broida et al., 1975; Hetherington et al., 1975; Luft, 1981).

Research on the effect of IPAs on hospital use is limited. Egdahl et al. (1977) present case studies that provide some preliminary evidence that IPAs decrease hospitalization. Other research on the effect of IPAs has focused on comparisons between three HMOs and a Blue Cross fee-for-service plan in Rochester, New York (Wersinger et al., 1976; Gavett and Smith, 1978; Roghmann et al., 1980). The plans investigated were Health Watch (IPA; plan not at risk for any services) Group Health (centralized PGP structure; plan at risk for physician services), and Rochester Health Network, (decentralized PGP; plan at risk for physician services). The benefits and premiums of the plans were similar (according to Roghmann et al., 1980). Health Watch had more hospitalizations than the fee-for-service plan, the Rochester Health Network and Group Health which had fewest hospitalizations. Comparing 1974 and 1975 to a 1972 baseline period, inpatient days per 1,000 enrollee years consistently decreased in Group Health, whereas in Health Watch and Rochester Health Network hospitalization rates increased. Adverse selection appears responsible for the increased hospitalization for Health Watch.

Ambulatory Use

Plan effect on ambulatory use has also been studied primarily by comparing HMOs with traditional fee-for-service plans. Results of many studies suggest that physician visits are higher in HMOs than in the fee-for-service sector (Williams et al., 1964; Broida et al., 1975; Perkoff et al., 1976; Riedel et al., 1975; Scitovsky et al., 1979. There is however great variation in the extent to which HMO ambulatory rates are higher than fee-for-service rates: Broida et al. (1975) reported a ratio of 2.29:1 HMO to fee-for-service visits whereas Hetherington et al. (1975) report a 1.07:1 ratio. Hastings et al. (1973) suggest that differences depend on the type of ambulatory service obtained. Slesinger et al. (1976) and Dutton (1979) echo this statement; they suggest that more preventive care services are obtained under HMOs than fee-for-service plans.

Results of other studies suggest that there are relatively fewer physician visits in HMOs compared with the fee-for-service sector (Anderson and Sheatsley, 1959; Shapiro et al., 1967) or that there is no difference across plans in the volume of services obtained (Record et al., 1980). Richardson et al. (1976) found that the overall visit rate per person per year was comparable between the HMO and fee-for-service plans but the fee-for-service plan had more heavy users and more low or non-users than did the HMO.

In-Plan Cost

Most studies of plan effect on in-plan cost have shown that by controlling hospitalizations HMOs reduce costs compared with fee-for-service plans. Results from several studies demonstrate lower total costs for HMOs (Anderson and Sheatsley, 1959; Williams et al., 1964; Hetherington et al., 1975; Richardson et al., 1980). But Perkoff et al. (1976) in a longitudinal study of Washington University Medical Care Group suggested that hospital savings for prepaid enrollees in this group practice did not compensate for the higher preventive care cost. The authors attribute the higher surgery rate in the prepaid group than the fee-for-service group to the increased access provided by prepayment.

In-plan costs were also compared for the Rochester, New York plans by Gavett and Smith (1978). Costs were evaluated in terms of plan charges per member year by service. Results show that in 1974 these charges were highest in Health Watch followed by Group Health and were lowest in Rochester Health Network. Again in 1975 Health Watch boasted the highest charges, however, the ordering of the other plans was reversed. Per member charges for the Rochester Health Network significantly increased while those for Group Health slightly decreased. Thus per member charges were lowest in Group Health. Researchers comparing the Rochester plans identifed adverse selection into Health Watch as the cause of the higher use rates and costs for the plan.

Out-Of-Pocket Costs

Many of the studies on out-of-pocket costs have been case studies or descriptive in nature. In general these out-of-pocket costs are considered in conjunction with premium costs; an adjustment is necessary because traditionally premiums for HMOs or PGPs have been higher than fee-for-service plans. Hetherington et al. (1975) and Sorensen et al. (1981) found that out-of-pocket expenditures were higher in the fee-for-service sector than for closed-panel HMOs and other prepaid group plans. The higher premiums of prepaid group plans do not offset out-of-pocket expenses; the average out-of-pocket expenditure per enrollee, considering both types of costs, is higher in the fee-for-service plans than in prepaid groups.

Summary

In summary, it appears that HMOs have lower hospital use than fee-for-service and IPA plans and that because hospitalization is expensive, HMOs therefore have lower in-plan costs than fee-for-service or IPA plans. In general HMOs have been shown to have higher ambulatory use than fee-for-service plans and it is unclear whether or not IPA plans have greater ambulatory use than HMOs.

Most research examining use and cost of health services for different types of health care plans has focused on fee-for-service plans versus closed-panel HMOs. Few studies have looked at the differential impact of IPAs and fee-for-service plans or have compared IPAs, closed-panel HMOs and fee-for-service plans. Furthermore, explicit physician incentives to control health care use and cost have not been incorporated into the structure of most IPAs and therefore little research has been done on physician incentives to contain health care use and cost within IPAs.

MODEL

Figure VI-2 shows a general model to explain use and cost of services. This model is based on the results of past studies and our hypotheses concerning this research setting. Dependent variables include in-plan use of services and out-of-pocket costs.

State health plan is a proxy variable for a number of diverse characteristics defining the plans under study (BC, GHC and UHC). The characteristics include organizational structure, (fee-for-service, HMO or IPA), financial structure, benefits covered, premium structure, administrative and billing arrangements, cost-sharing on the part of enrollees, relationships with and use of providers (especially the use of PCPs), ownership and use of facilities, and access to care. Unfortunately, we cannot separate the effects of the above characteristics to determine the impact of organizational structure only on use and cost of services. In addition, we included a variable which indicates exposure to the plan measured by the number of months during our study that an enrollee was on the plan.

Independent variables in the model include: sociodemographic characteristics such as age, sex, race; family structure and resources such as family size, income, education and availability of care at home; perceived need and health status variables; variables indicating past health care experience including usual source of care and satisfaction with the plan and providers; and variables indicating current health insurance coverage. (The specific variables included in these basic conceptual groups are discussed in the results section and Volume II, Appendix VI.1.)

Most of the independent variables considered in this study were chosen because of their usefulness in other studies of health services. Whenever possible, variables were operationally defined as they were in those previous studies. Single indicators of independent variables were used in descriptive analyses and in some of the multivariate analyses. In addition, indices of health status and socioeconomic status were used in testing the model and in constructing interaction terms. (Index construction is described in Volume II, Appendix VI.2.)

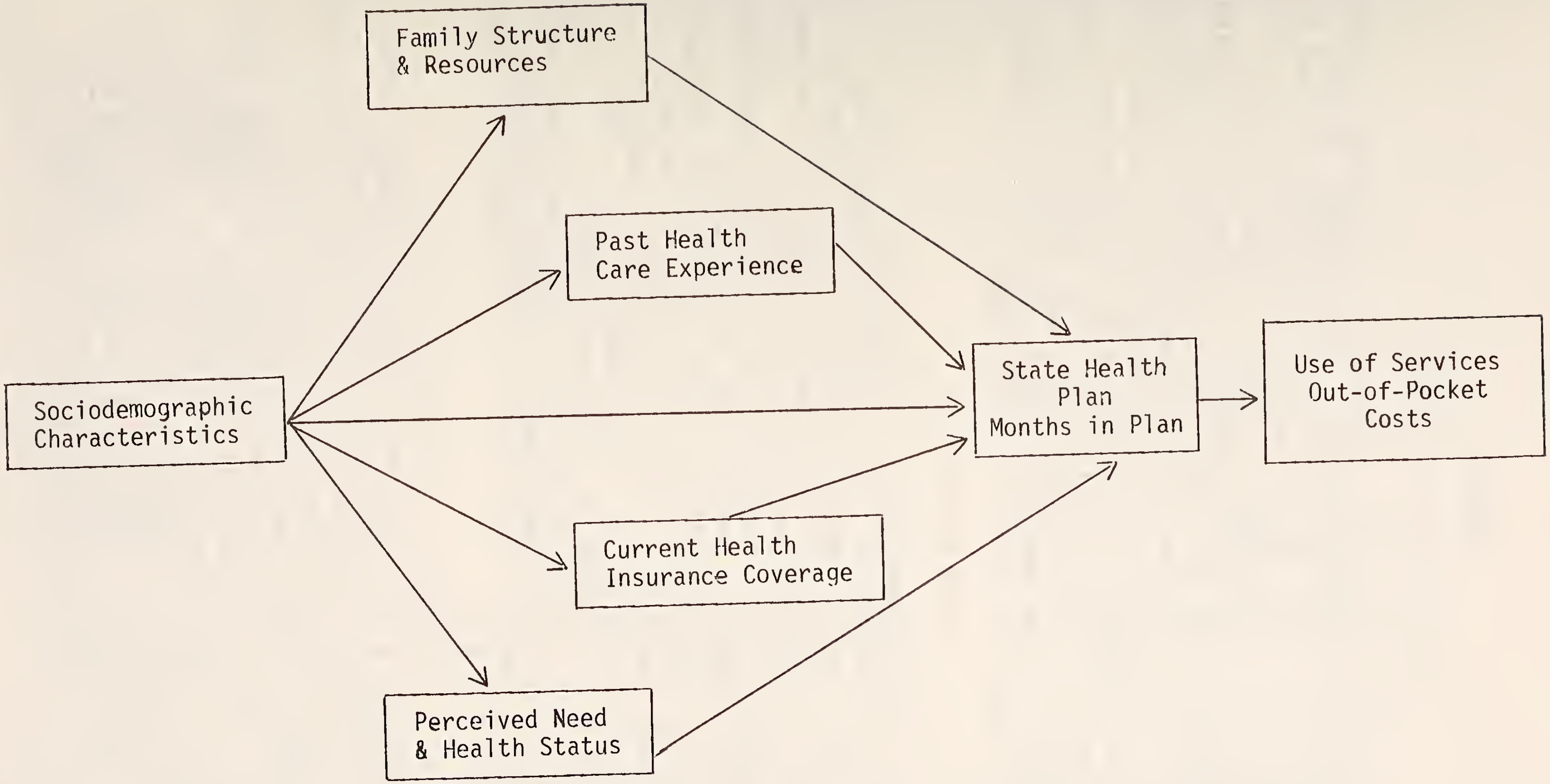

Family Structure & Resources
Past Health Care Experience
Sociodemographic Characteristics
State Health Plan Months in Plan
Use of Services Out-of-Pocket Costs
Current Health Insurance Coverage
Perceived Need & Health Status

FIGURE VI-2
COMPARATIVE UTILIZATION MODEL

METHODS

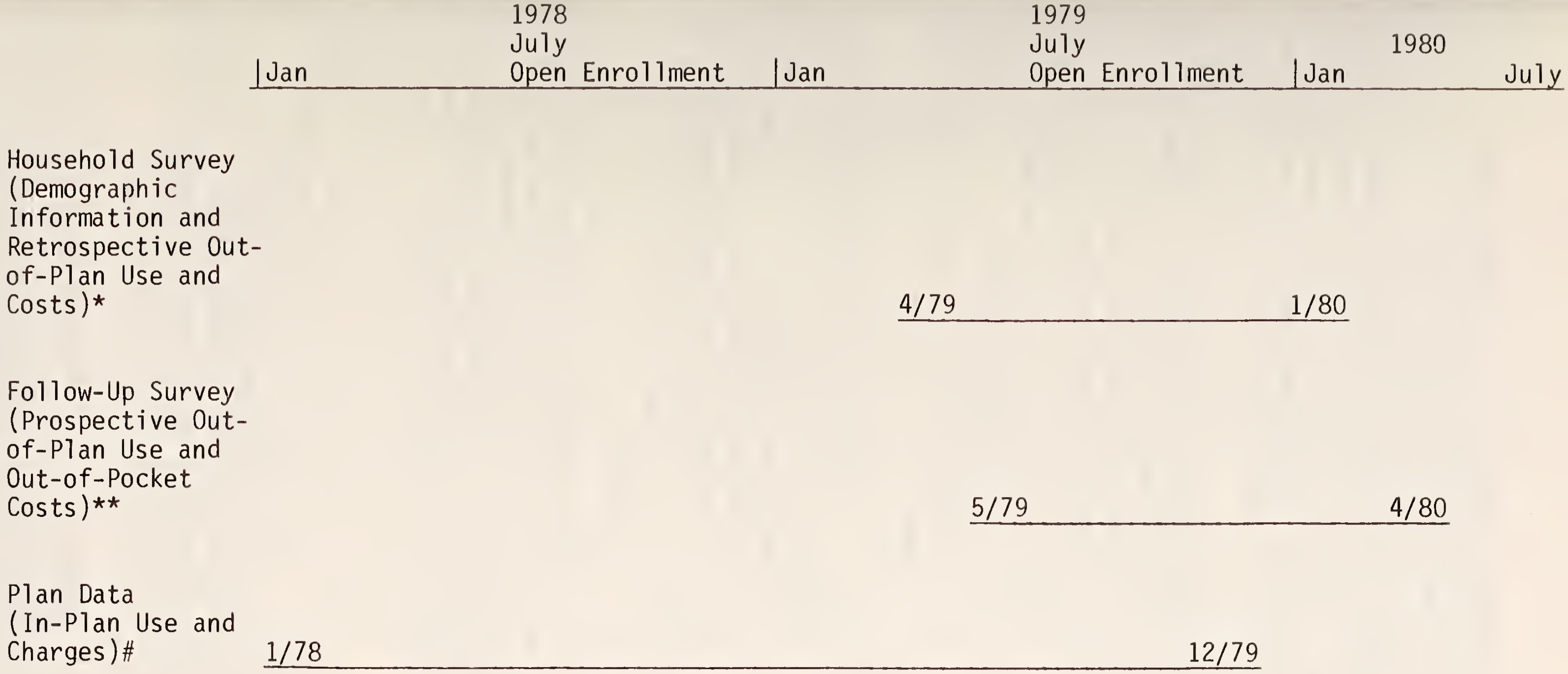
Population and Sample

The population of interest consisted of individuals who: (1) were employed by Washington State; (2) resided in King County which incorporates the city of Seattle; and (3) had a health plan effective date prior to May 1, 1978 and were active employees as of December 31, 1978. These criteria eliminated from the population employees who were not eligible to switch coverage in the May 1978 open enrollment period. Thus, the population excluded newly hired employees, employees of less than two months and retired employees. A random sample stratified according to present plan and previous coverage was drawn from the population. The sample of 3,609 enrollees consisted of 1,936 subscribers and their family members. (Details of the sampling frame, size and rationale are provided in Chapter V and Volume II, Appendix V.1.)

Data Collection

To examine factors associated with use and cost of services, data were collected from interviews with state employees and their family members and also from claims or medical records at the health care plans. Figure VI-3 shows the types of data collected during the study period. Background information was obtained from an initial interview at which all family members were asked to be present. Subscriber, spouse and children at least 19 years of age were asked to respond to questions about themselves. The adult with most knowledge regarding the health care of family members provided information on those under age 19. The interviews included questions on sociodemographic characteristics, health status, perceived need for care, usual source of care, current and past health insurance coverage, and out-of-plan use and out-of-pocket costs of health services (Volume III, Appendix V.1).

Subscribers in the sample received letters of introduction from the State Employees Insurance Board, their health care plan and the study's principal investigator. University of Washington employees also received a letter from the University president (Volume III, Appendix V.2). Approximately one week after mailing letters of introduction, a trained interviewer contacted the subscriber by phone to set up an interview. At that time, the interviewer suggested that the subscriber have available during the interview medical records, previous bills, reimbursements, etc. and information regarding other health insurance plans to facilitate response to questions. Interviewing took place between April 1979 and January 1980. The length of the interview varied from 45 minutes to one and a half hours depending on the number of individuals covered by the subscriber's plan and the amount of health services used.



*Families were asked to recall out-of-pocket cost from January 1, 1978 and out-of-plan use from January 1, 1979 to the time of interview. Initial interviews took place between April 1979 and January 1980 so some families had an appreciably longer recall.

**Families were asked to report out-of-plan use and out-of-pocket costs each month for six months. Interviewing was conducted over a calendar year to examine the effect of seasonality.

#We allowed a minimum six month lag in collecting data from the plans so that approximately 99% of claims at BC & UHC would be processed and all procedures would be recorded in GHC medical records.

FIGURE VI-3
COMPARATIVE UTILIZATION DATA COLLECTION

A prospective approach was used in order to obtain more accurate information on out-of-plan use and cost of services. During the initial interview respondents were given a calendar/diary to record information about health status and out-of-plan use of services and out-of-pocket costs (Volume III, Appendix VI.1). An interviewer called the family once a month for six months to obtain the information recorded on the calendar. The response rate for the initial and six follow-up interviews was 93 percent (Volume II, Appendix VI.3).

The calendar/diary was used to facilitate daily record keeping of health related problems and use of services. Due to the contrast between the BC reimbursement scheme and the in-plan, out-of-plan distinctions under GHC and UHC, two versions of the diary were used. BC enrollees recorded all use of health services whereas subscribers to the other plans noted only out-of-plan use of services. Space was provided for details of monthly health care use such as hospital or nursing home stays, emergency room visits or medical care visits.* Respondents were asked to record on the appropriate calendar date each time a family member: (1) visited a health care provider; (2) telephoned a health care provider; (3) was sick in bed all or most of the day; (4) missed work, school or work around the house due to illness or injury; and (5) cut down on other activities due to illness or injury. Respondents recorded out-of-pocket expenses and/or reimbursements for health services each month and could file the bills and receipts in a pocket attached to the calendar.** Each month a telephone interview was conducted to obtain information recorded on the calendar. The calendar was used only as a memory aid and was not collected.

Information on in-plan use and charges for services was abstracted from medical records at GHC and from claims records at BC and UHC (Volume III, Appendix VI.2).*** In-plan data were collected for six months prior to the introduction of UHC (January 1, 1978 to June 30, 1978) and for 18 months after the introduction of UHC (July 1, 1978 to December 31, 1979).

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*Out-of-plan use has not yet been analyzed; only out-of-pocket cost is examined in this report. Estimates of out-of-pocket costs may be less reliable or valid for BC than the other two plans because BC enrollees had higher out-of-pocket costs including the deductibles and coinsurance which were spread over a number of visits, whereas out-of-pocket costs for GHC and UHC enrollees were probably associated with one or two out-of-plan visits.

**Denied claims or portions of claims were included in out-of-pocket costs.

***Cost information is not available from GHC because their method of payment does not require itemization of cost for procedures.

Variable Definitions and Method of Analysis

The basic unit of analysis for the comparative utilization study is the person. As shown in Table VI.1, the group selected for analysis includes 3,553 individuals (1,495 subscribers). To be included in this group, enrollees must have completed the household survey, agreed to participate in the follow-up study and had at least 12 months of exposure to a state health plan during the study period of July 1, 1978 through December 31, 1979.* It was expected that this group would yield more stable results than the entire sample due to high months of exposure to the plans. This group includes 32 enrollees in 11 families in which both the subscriber and spouse were state employees covered by a state health plan. The sample for analysis excludes people ineligible for the study, nonrespondents, enrollees with less than 12 months of continuous enrollment in their health care plan, enrollees who switched to another health care plan during the 1979 open enrollment and family members (spouse or children) added after the initial household interview.

Our primary dependent variable of interest was standardized volume of services per year because it was believed that this was the most comparable measure across plans. Standardized volume is a measure of intensity of services used and is defined in dollars as an "imputed expenditure." Standardized volume is presented for total, inpatient and ambulatory care. We also present annualized out-of-pocket costs for all three plans.

Since GHC does not charge for services, standardized volume of health services for each person was calculated. In brief, the median Blue Cross charge for each procedure performed was attached to that procedure and these were summed for each person. This standardized volume was used for each plan to provide a comparable measure of the volume of services performed, independent of the pricing structure of each plan. This means, for instance, that any cost savings achieved at GHC through the use of less expensive personnel are not reflected in this standardized volume. Thus, standardized volume is not the estimate of actual costs of care in any of the plans.

Univariate results are presented first followed by multivariate results. Univariate results for use of services are presented as annualized age-sex adjusted rates for each of

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*Criteria for selection into the analysis group for comparative utilization as described here and for choice-of-plan as presented in Chapter V are not the same. Consequently, the number of subscriber units used in analyses differs slightly in these two components of this study.

TABLE VI-1
SAMPLE FOR ANALYSIS* BY PLAN

Enrollee	BC (N=1316)	GHC (N=950)	BC-UHC (N=955)	GHC-UHC (N=332)	P-value
Subscribers	561 (42.6%)	397 (41.8%)	393 (41.2%)	144 (43.4%)	
Spouses	323 (24.5%)	197 (20.7%)	223 (23.4%)	66 (19.9%)	.17
Children	432 (32.8%)	356 (37.5%)	339 (35.5%)	122 (36.7%)	

*Sample includes eligible enrollees who completed the household interview and maintained at least 12 months continous enrollment in plan. For more details on the sample design, refer to Volume II, Appendix V.1.

the plans.* We also examined characteristics of enrollees across the plans. Differences among the three plans were tested using chi-square or analysis of variance. Significance tests were performed for differences between each combination of plans but only the overall significance is shown in the tables.

Next we looked at the correlates of use, examining the independent variables in relation to standardized volume of inpatient and outpatient services. Both simple correlations and partial correlations controlling for exposure, age, sex, age squared and age by sex are presented. These correlations indicate the direction of differences and strength of the relationship.

Univariate results are presented adjusting only for age and sex, but other variables possibly may be confounding variables. Therefore multivariate analyses were performed to control for the effects of independent variables which may differ across the three health plans. The first multivariate analysis tests the effect of the plan on standardized volume of services. By controlling for a number of independent variables we can reduce or explain the variablity in the dependent variable, thus allowing detection of smaller differences among the three plans. In addition, we tested for interactions between the plan and other independent variables.

Also multivariate analyses were performed to test a general model of utilization as well as to determine the configuration of variables which most fully explains use in each of the plans, i.e., develop a "best fitting" model for each plan. In these models we use specific independent variables as well as indices of certain variables. All multivariate analyses for estimation or hypotheses testing were tested on a randomly selected half of the analysis group and then verified on the remaining half of the group.

UNIVARIATE ANALYSIS

Characteristics of Subscribers and Enrollees Across Plans

Differences in family (subscriber) and person characteristics including sociodemographic characteristics, family structure and resources, perceived need and health status, past health care experience and current health insurance coverage were compared across plans. Most comparisons are presented for the three plans, BC, GHC, and UHC. When we examine differences in plans before and after the July 1978 enrollment period we present results for UHC broken down by people who were BC enrollees and then switched to UHC (BC-UHC) and for people who were GHC enrollees and then switched to UHC (GHC-UHC). Although we do not present the results here, we ran all comparisons across the four plans (BC, GHC, BC-UHC and GHC-UHC) and in general BC-UHC enrolles tended to be more like enrollees who remained with BC and GHC-UHC enrollees tended to be more like enrollees who remained with GHC. Variables were compared across plans using chi-square or analysis of variance techniques.

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* Crude rates and age-sex specific rates were also calculated and tested but are not presented because there were few important differences between the crude, age-sex specific rates and age-sex adjusted rates across plans.

We examined plan differences with regard to sociodemographic characteristics hypothesized to be positively associated with use of services. There were significant differences in age and race distributions across the three plans as shown in Table VI-2a. BC had a higher proportion of enrollees who were older and of the white race than the other two plans. GHC had a higher percentage of younger and non-white enrollees and UHC percentages fell between those of BC and GHC. There was no significant difference in percentage of female enrollees across plans.

GHC subscribers had been employed by the state for significantly fewer months and had resided in King County for a shorter length of time than the other two plans (Table VI-2b). These results are statistically significant, but it is unlikely that they have practical signficance because such small differences among plans in state employment and length of residence would not affect use, i.e., if on the average individuals had been employed by the state for three years, an additional month of employment would not make them more or less likely to use services.

As indicated by the family scale variable, GHC tended to have younger subscribers (under 40 years of age) with more children under the age of six (Table VI-3a). Marital status, family size, household size, family composition and availability of someone at home to care for sick family members did not differ significantly among the plans.

Income of BC families was significantly higher than that of families covered by the other two plans (Table VI-3b). In addition, BC and GHC subscribers had higher educational levels and were more likely to be professionals than UHC enrollees. GHC also had significantly more subscribers who were employed by higher education institutions. In the past employees of Washington State higher education institutions have been higher users of services than employees of other types of state agencies. There were no differences among plans in percentages of spouses working for the state or some other employer.

Regarding perceived need and health status, there were no differences in overall perceived health status compared to people of the same age across plans (Table VI-4). The number

TABLE VI-2a
SOCIODEMOGRAPHIC CHARACTERISTICS BY PLAN
(PERSON-BASED)

Variable	BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
Age				
0-5 years	3.0%	7.6%	5.1%	.00
6-18	25.5	25.5	27.7	
19-44	36.2	47.7	38.7	
45-71	35.4	19.3	28.4	
Mean	34.84	29.31	31.77	.00
S.D.	17.82	16.90	17.66	
Sex				
Male	45.4%	48.1%	45.7%	.39
Female	54.6	51.9	54.3	
Race				
White	87.9%	75.8%	84.7%	.00
Non-white	12.1	24.2	15.3	

TABLE VI-2b
SOCIODEMOGRAPHIC CHARACTERISTICS BY PLAN
(FAMILY-BASED)

Variable	BC (N= 561)	GHC (N= 397)	UHC (N= 537)	P-value
Subscriber's Marital Status				
Never married	18.5%	19.6%	17.6%	.36
Married	64.5	60.2	59.6	
Separated	1.8	2.5	2.1	
Divorced	12.7	15.4	16.6	
Widowed	2.5	2.3	4.1	
Subscriber's Marital Status (recoded)				
Not Married	35.5%	39.8%	40.4%	.20
Married	64.5	60.2	59.6	
Length of State Employment				
8-41 months	26.1%	32.7%	25.3%	.03
42+	73.9	67.3	74.7	
Mean	37.89	36.56	38.04	.02
S.D.	8.20	9.62	8.47	
Residence in King County				
1-60 months	16.0%	18.9%	14.2%	.00
61-120	13.5	23.7	16.2	
121-180	16.0	17.1	18.4	
181-240	13.4	8.1	12.3	
241+	41.0	32.2	38.9	
Mean	246.58	200.27	230.85	.00
S.D.	176.90	151.49	162.52	

TABLE VI-2b (continued)

Variable	BC (N= 561)	GHC (N= 397)	UHC (N= 537)	P-value
Subscriber's Race				
White	89.6%	79.5%	86.0%	.00
Black	3.9	7.8	5.1	
Asian	4.8	9.1	5.8	
Other	1.6	3.5	3.2	
Spouse's Race				
White	90.1%	78.2%	86.7%	.00
Black	2.8	7.6	2.8	
Asian	6.2	9.6	7.4	
Other	.9	4.6	3.2	
(N=804)	(322)	(197)	(285)	

TABLE VI-3a
FAMILY STRUCTURE VARIABLES BY PLAN
(FAMILY-BASED)

Variable	BC (N= 561)	GHC (N= 397)	UHC (N= 537)	P-value
Family Size				
1	34.6%	37.3%	34.1%	.59
2	28.9	24.9	25.7	
3	14.4	12.6	16.2	
4	14.3	14.6	15.5	
5	4.8	6.8	6.3	
6-10	3.0	3.8	2.2	
Household Size				
1	18.9%	17.1%	20.9%	.29
2	36.7	34.3	31.8	
3	18.7	17.1	19.9	
4	16.0	16.9	16.4	
5	5.5	9.3	7.8	
6-10	4.1	5.3	3.2	
Family Scale*				
0	5.3%	11.6%	7.6%	.00
1	17.8	24.2	16.6	
2	20.0	7.8	13.4	
3	16.4	12.3	16.2	
4	3.7	2.0	1.5	
5	.5	1.3	.4	
6	26.6	23.4	28.5	
7	2.7	2.8	4.1	
8	6.8	13.1	11.0	
9	.2	1.5	.7	
Family Composition				
Subscriber only	34.6%	37.3%	34.1%	.18
Subscriber & Spouse	25.6	19.4	20.5	
Subscriber & Child	3.4	5.5	5.2	
Subscriber & Spouse & Child	36.4	37.8	40.2	

TABLE VI-3a (continued)

Variable	BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
		(person-based)		
Availability of Home Care				
No	18.5%	18.9%	16.6%	.30
Yes	81.5	81.1	83.4	

*Family Scale values:

0 = Married, no children, subscriber < 40
1 = Single, no children, subscriber < 40
2 = Married, no children, subscriber > 40
3 = Single, no children, subscriber > 40
4 = Married, with youngest child > 18
5 = Single, with youngest child > 18
6 = Married, with youngest child between 6 and 18
7 = Single, with youngest child between 6 and 18
8 = Married, with youngest child < 6 years
9 = Single, with youngest child < 6 years

TABLE VI-3b
SOCIAL STRUCTURE VARIABLES BY PLAN (FAMILY-BASED)

Variable	BC (N= 561)	GHC (N= 397)	UHC (N= 537)	P-value
Type of State Employment				
UW	55.4%	61.0%	51.0%	.00
Other Higher Ed	10.0	34.5	6.3	
Other State Agency	34.6	4.5	42.6	
Subscriber and Spouse State Employment				
Subscriber only	93.0%	95.0%	93.1%	.42
Subsc and Spouse	7.0	5.0	6.9	
Household Income				
<$4000	0%	.5%	0%	.00
4001-8000	1.4	3.5	1.3	
8001-12000	9.3	16.4	15.6	
12001-16000	13.0	14.9	13.4	
16001-20000	11.4	14.9	16.6	
20001-24000	12.1	13.6	12.3	
24001-28000	10.7	10.3	11.7	
28001-32000	11.6	9.8	7.6	
32001-36000	6.4	5.0	8.4	
36001-40000	5.9	3.8	5.0	
40001-44000	3.6	2.5	2.6	
44001+	14.6	4.8	5.4	
Subscriber's Occupation				
Labor	4.8%	5.8%	6.7%	.00
Clerk, Service, Sales	32.5	33.1	43.0	
Professional Administrative	62.7	61.1	50.3	
Subscriber's Education				
0-12 years	20.0%	17.9%	22.2%	.00
13-16	37.3	46.7	49.0	
17-21+	42.7	35.4	28.8	

TABLE VI-3b (continued)

Variable	BC (N= 561)	GHC (N= 397)	UHC (N= 537)	P-value
Spouse's Education				
0-12	25.5%	22.3%	31.4%	.14
13-16	46.9	50.3	47.0	
17+	27.6	27.4	21.6	
(N=)	(322)	(197)	(283)	
Subscriber and Spouse Employment Status*				
1	2.1%	4.0%	1.9%	.16
2	57.4	62.0	60.7	
3	.4	.5	.4	
4	29.4	21.2	27.0	
5	7.8	10.1	7.8	
6	2.9	2.3	2.2	

*Subscriber and Spouse Employment Status values:

1 = Subscriber part-time, spouse not employed or doesn't exist
2 = Subscriber full-time, spouse not employed or doesn't exist
3 = Subscriber and spouse part-time
4 = Subscriber and spouse full-time
5 = Subscriber full-time, spouse part-time
6 = Subscriber part-time, spouse full-time

TABLE VI-4
HEALTH STATUS CHARACTERISTICS BY PLAN
(PERSON-BASED)

Variable	BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
Health Status				
Excellent	56.8%	56.9%	56.5%	.33
Good	36.1	35.1	37.3	
Fair	6.1	7.5	5.3	
Poor	1.1	.5	.9	
Health Status-Compared to People Of Same Age				
Better	43.3%	44.7%	40.3%	.06
Same	54.0	51.4	55.5	
Worse	2.7	3.9	4.2	
DISABILITY DAYS:				
Number of In-Bed Days				
None	92.6%	92.1%	92.5%	.53
1	3.4	4.6	3.5	
2	1.7	1.5	2.2	
3	1.4	1.1	.7	
4-14	.9	.8	1.1	
Mean	.17	.16	.16	.94
S.D.	.81	.81	.75	
Number of Missed Primary Activity Days				
None	92.5%	91.9%	92.7%	.95
1	4.0	4.4	3.7	
2	1.8	1.6	1.6	
3	.6	.5	.5	
4-14	1.0	1.5	1.5	
Mean	.16	.19	.20	.60
S.D.	.83	1.01	1.09	

TABLE VI-4 (continued)

Variable	BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
Number of Limited Activity Days				
None	92.5%	88.8%	90.3%	.01
1	2.1	3.5	3.5	
2	2.1	2.8	2.7	
3	.6	1.3	1.0	
4	1.1	.4	.5	
5-14	1.7	3.3	1.9	
Mean	.25	.44	.31	.01
S.D.	1.14	1.78	1.44	
Total Disability Days				
None	84.5%	81.7%	83.4%	.57
1	5.0	5.5	5.0	
2	3.6	4.0	3.7	
3	1.5	2.1	1.9	
4	1.4	1.0	1.1	
5	1.2	.8	1.1	
6-14	2.8	4.9	3.7	
Mean	.58	.80	.67	.07
S.D.	1.98	2.50	2.23	
CHRONIC CONDITIONS:				
Emphysema & Bronchitis				
No	97.2%	96.7%	95.5%	.06
Yes	2.8	3.3	4.5	
Sinus Trouble				
No	90.6%	89.3%	90.1%	.60
Yes	9.4	10.7	9.9	
Hemorrhoids, Piles				
No	93.8%	92.1%	93.3%	.31
Yes	6.2	7.9	6.7	

TABLE VI-4 (continued)

Variable	BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
Hayfever, Allergies				
No	77.5%	79.1%	76.9%	.46
Yes	22.5	20.9	23.1	
Cancer, Malignant Tumor				
No	98.7%	99.3%	98.8%	.44
Yes	1.3	.7	1.2	
Benign Tumor, Cyst				
No	93.6%	94.1%	94.7%	.53
Yes	6.4	5.9	5.3	
Gallbladder, Liver Trouble				
No	99.4%	99.6%	98.9%	.15
Yes	.6	.4	1.1	
Ulcer, Stomach Trouble				
No	96.9%	94.9%	95.4%	.05
Yes	3.1	5.1	4.6	
Kidney Trouble				
No	99.2%	99.2%	99.2%	.98
Yes	.8	.8	.8	
Thyroid, Goiter Trouble				
No	96.3%	98.5%	97.2%	.01
Yes	3.7	1.5	2.8	
Emotional, Mental Trouble				
No	95.4%	94.7%	93.2%	.05
Yes	4.6	5.3	6.8	

TABLE VI-4 (continued)

Variable	BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
Skin Trouble				
No	91.3%	90.7%	90.8%	.87
Yes	8.7	9.3	9.2	
Back Trouble				
No	89.1%	90.1%	91.3%	.17
Yes	10.9	9.9	8.7	
High Blood Pressure, Hypertension				
No	90.3%	93.7%	92.4%	.01
Yes	9.7	6.3	7.6	
Diabetes				
No	97.9%	98.2%	98.5%	.45
Yes	2.1	1.8	1.5	
Heart Trouble				
No	98.5%	99.4%	99.1%	.13
Yes	1.5	.6	.9	
Mid-Ear Infection				
No	95.9%	94.2%	95.4%	.17
Yes	4.1	5.8	4.6	
Eye Trouble				
No	96.7%	98.2%	97.9%	.05
Yes	3.3	1.8	2.1	
Arthritis, Rheumatism				
No	91.4%	92.4%	91.2%	.58
Yes	8.6	7.6	8.8	

TABLE VI-4 (continued)

Variable	BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
Number of Chronic Conditions				
None	43.4%	43.2%	41.6%	.93
1	28.1	28.7	28.5	
2	15.9	16.5	16.8	
3+	12.7	11.6	13.0	
Mean	1.10	1.06	1.10	.67
S.D.	1.40	1.28	1.27	
Number of Chronic Conditions Under Under Care of MD				
Mean	.77	.73	.77	.56
S.D.	1.15	1.01	1.08	
Chronic Conditions Not Under Care of MD				
Mean	.34	.35	.34	.89
S.D.	.71	.82	.69	

of bed-days and missed primary activity days also did not differ across plans but but both GHC and UHC enrollees reported significantly more days of limited activity than BC enrollees. With regard to significant differences across plans in reporting various chronic conditions, GHC and UHC had higher numbers of people with ulcers and more people with emotional problems than BC However, BC had higher percentages of people with thyroid conditions, hypertension or eye problems than the other two plans. There were no significant differences in the number of chronic conditions across plans.

A series of questions indicating mental health status was given to all enrollees 19 years of age or older (Table VI-5). Of the individual items only "feeling bored" differed across plans with higher percentages on GHC and UHC enrollees reporting boredom than BC enrollees. The overall mental health index showed that GHC enrollees had significantly higher scores or reported more emotional problems than BC enrollees, but GHC enrollees did not differ significantly from UHC enrollees regarding overall mental health. This finding corresponds with higher percentages of GHC and UHC enrollees reporting emotional problems as a chronic condition.

Propensity to seek care was measured by asking enrollees to explain how they would care for a given problem: would they ignore the problem, treat it themselves or contact a provider? A significantly higher percentage of GHC and UHC enrollees said that they would contact providers for problems, whereas BC enrollees were more likely to say that they would treat the problems themselves (Table VI-6). Perhaps the tendency for BC enrollees to treat themselves is a result of the deductible.

Table VI-7 shows current health insurance coverage of enrollees. Although the number of months enrollees were covered by the state plan is statistically significant, all three plans have very similar means (the greatest difference

TABLE VI-5
MENTAL HEALTH STATUS BY PLAN
(PERSON-BASED)*

Variable	BC (N= 883)	GHC (N= 603)	UHC (N= 818)	P-value
Feel Lonely or Isolated From Others				
Never	50.3%	43.6%	47.6%	.28
Seldom	35.0	38.1	35.6	
Sometimes	13.9	17.4	16.0	
Often	.7	.8	.7	
Feel Depressed or Unhappy				
Never	28.9%	24.4%	25.6%	.34
Seldom	51.2	53.2	51.2	
Sometimes	18.3	21.2	21.8	
Often	1.6	1.2	1.5	
Feel Bored				
Never	31.9%	28.6%	24.7%	.02
Seldom	42.9	41.0	46.0	
Sometimes	23.7	27.9	26.4	
Often	1.6	2.5	2.8	
Wonder if Anything Is Worthwhile				
Never	59.2%	55.6%	58.7%	.86
Seldom	29.8	33.3	30.5	
Sometimes	10.3	10.4	10.1	
Often	.7	.7	.7	
Feel Very Restless				
Never	45.6%	40.0%	42.4%	.44
Seldom	34.5	37.0	37.0	
Sometimes	16.8	18.6	17.1	
Often	3.1	4.3	3.5	
Feel Uneasy Without Knowing Why				
Never	37.1%	35.5%	34.6%	.61
Seldom	44.8	44.4	43.5	
Sometimes	16.9	19.1	20.4	
Often	1.1	1.0	1.5	

TABLE VI-5 (continued)

Variable	BC (N= 883)	GHC (N= 603)	UHC (N= 818)	P-value
Feel on Top of The World				
Often	27.8%	24.8%	25.6%	.52
Sometimes	55.6	55.7	58.4	
Seldom	10.8	12.1	10.3	
Never	5.7	7.3	5.7	
Feel Excited or Interested in Something				
Often	52.2%	50.7%	48.5%	.35
Sometimes	42.7	43.4	47.3	
Seldom	3.9	4.6	2.8	
Never	1.2	1.2	1.3	
Feel Pleased About Accomplishment				
Often	59.1%	56.2%	56.2%	.43
Sometimes	37.9	40.0	41.6	
Seldom	1.8	2.3	1.1	
Never	1.1	1.5	1.1	
Mental Health Scale				
0-15	52.9%	44.4%	47.0%	.03
16-20	36.9	44.6	42.8	
21-25	9.1	10.4	8.9	
26-30	1.1	.7	1.2	
Mean	15.58	16.17	15.99	.01
S.D.	3.62	3.47	3.56	

*The mental health questions were answered only by respondents 19 years of age and older.

TABLE VI-6
PROPENSITY TO SEEK CARE VARIABLES BY PLAN (PERSON-BASED)*

Variable	BC (N=1258)	GHC (N= 915)	UHC (N=1258)	P-value
Number of Symptoms Ignore				
Mean	2.70	2.57	2.68	.54
S.D.	2.82	2.76	2.80	
Number of Symptoms Self-Treat				
Mean	4.86	4.53	4.48	.00
S.D.	3.37	2.91	2.84	
Number of Symptoms Contact Provider				
Mean	12.43	12.90	12.85	.00
S.D.	3.89	3.59	3.65	

*Twenty questions or problems were described and were answered by or for persons one year of age and older

TABLE VI-7
HEALTH INSURANCE COVERAGE BY PLAN
(PERSON-BASED)

Variable	BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
Months of State Plan Coverage 7/78-12/79				
Mean	17.85	17.70	17.84	.00
S.D.	.85	1.19	.84	
Other Insurance is BC or KCM*				
No	85.3%	91.1%	89.1%	.00
One	14.7	8.7	10.1	
Both	0	.1	.9	
Other Insurance is HMO or GHC				
No	95.1%	97.9%	94.5%	.00
One	4.9	2.1	5.5	
Both	0	0	.1	
Other Insurance is Commercial Insurance				
No	84.4%	93.5%	88.5%	.00
Yes	15.6	6.5	11.5	
Has Misc. Other Insurance Coverage				
None	90.6%	93.3%	91.3%	.23
One plan	9.1	6.5	8.4	
Two plans	.4	.2	.2	
Total Other Insurance Coverage				
No other insurance	58.8%	77.0%	64.4%	.00
One other plan	37.5	21.4	33.7	
Two other plans	3.7	1.6	1.7	
Three other plans	0	0	.2	

*King County Medical (KCM) is a physicians' service bureau plan operating in the greater Seattle area.

is four days) and medians.* Because GHC and UHC had significantly fewer enrollees with other types of health insurance, we would expect that they would have higher use of their state health plan.

Past health care experience was evaluated by examining out-of-pocket costs and in-plan use of services at BC or GHC for the period from January to June 1978 prior to the opportunity to switch to the new UHC plan. As shown in Table VI-8, BC families reported significantly higher out-of-pocket costs than GHC families. As expected, families switching to UHC were significantly more dissatisfied with out-of-pocket costs compared to the level of dissatisfaction displayed by enrollees remaining with their respective plans; however, on the average, switchers' out-of-pocket costs were only $7 higher. Differences in in-plan use of services prior to the 1978 enrollment are presented in a later section of this chapter.

Based on the characteristics we assessed, we find that BC and GHC enrollees would be expected to use more services than UHC enrollees. These characteristics were included in the multivariate model discussed in a later section of this chapter.

Usual Source of Care Across Plans

Whether individuals had a usual source of care at the time of the study, the way they used that usual source of care and their access to that usual source of care were examined. These variables indicate plan characteristics because each plan promoted the use of a regular source of health care in a slightly different way. UHC required an enrollee to choose a PCP as the usual source of care upon enrollment in the plan. GHC strongly encouraged enrollees to choose a PCP as a usual source of care before using the plan for the first time. BC had no stated preference for using a usual source of care. These differences are reflected in our usual source of care results (Table VI-9).

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*Because all of our data were adjusted for months enrolled in the plan (exposure), we were interested in ascertaining the reliability and validity of our exposure data. Therefore we did a small study at each plan (50 families in each plan) to examine family members' exposure at the time the sample was drawn, at the beginning of the utilization study period, at the time of the initial interview, at the end of the follow-up interviews and at the end of the utilization study period. In order to evaluate exposure we used plan membership and claim information, information obtained through interviews and subsequent contacts with both the plan and the enrollees to determine the accuracy of exposure. We found that exposure estimates based on plan information and the exposure of the family at the end of the follow-up period was an accurate estimate for all three plans.

TABLE VI-8
PAST HEALTH CARE EXPERIENCE BY PLAN (FAMILY-BASED)

Variable	BC (N= 561)	GHC (N=397)	BC-UHC (N=393)	GHC-UHC (N=144)	P-value
Had out-of-pocket costs 1/78 to 6/78					
No	20.5%	61.6%	20.5%	55.2%	.00
Yes	79.5	38.4	79.5	44.8	
Amount of out-of-pocket costs (1/78-6/78)					
None	21.0%	62.1%	20.8%	55.2%	.00
$1-99	42.0	32.3	38.0	34.3	
$100-199	20.3	3.8	22.9	6.3	
$200+	16.8	1.8	18.2	4.2	
Mean	$120.04	$21.26	$126.86	$28.05	.00
S.D.	227.35	68.83	274.39	58.15	
Satisfaction with out-of-pocket costs 1/78-6/78					
About right	73.1%	89.6%	46.5%	84.6%	.00
Too much	14.8	5.1	27.2	7.7	
Far too much	12.1	5.3	26.2	7.7	

TABLE VI-9
USUAL SOURCE OF CARE (USC) BY PLAN
(PERSON-BASED)

Variable	BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
Type of Usual Source of Care				
No USC	5.8%	.2%	1.0%	.00
Place only	6.2	10.9	1.6	
PCP	66.6	74.2	87.2	
Non-PCP	21.4	14.8	10.2	
Specialty of USC				
No Person as USC	14.7%	10.8%	2.7%	.00
GP, FP	36.6	63.9	45.8	
Pediatrician	14.1	13.8	16.9	
Internist	20.4	2.4	25.4	
Ob-Gyn	5.2	1.6	4.6	
Surgeon	2.2	.3	.8	
Other	6.8	7.2	3.9	
Years with USC				
No USC	5.8%	.3%	1.3%	.00
One Year	13.8	27.0	38.8	
Two Years or more	80.4	72.6	60.0	
Visited USC in Year Post-Switch				
No USC	5.8%	.2%	1.0%	.00
No Visits	20.1	25.0	19.0	
Visited	74.1	74.8	80.0	
Make Appointments				
No USC	5.8%	.2%	1.0%	.00
No Visits	20.1	25.0	19.1	
No Appointments	2.7	1.7	1.3	
Made Appointment	69.5	72.5	77.5	
Assigned Appointment	1.9	.6	1.1	

TABLE VI-9 (continued)

Variable	BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
Days for Appointment				
Mean	7.75	10.47	4.98	.00
S.D.	14.33	14.16	10.20	
Travel Time to USC				
Mean	16.81	20.13	15.29	.00
S.D.	11.70	12.83	9.94	
Waiting Time in USC Office				
Mean	22.27	20.15	19.31	.00
S.D.	23.68	16.38	15.64	
Occurrence of Non-Referred Visits				
No USC	5.8%	.2%	1.0%	.00
USC Not MD	6.2	11.3	1.6	
No Non-ref Visits	71.8	80.7	90.7	
Made Non-ref Visits	16.2	7.8	6.7	
Desired Referral				
No USC	5.8%	.2%	1.0%	.00
USC not MD	6.1	11.3	1.6	
Did Not Desire Referral	86.5	82.1	94.6	
Desired Referral	1.6	6.4	2.8	
Total Number of Non-Referred Visits				
Mean	.84	.30	.38	.00
S.D.	2.66	1.32	2.70	

As expected, there was a significantly higher proportion of BC enrollees with no usual source of care. But BC enrollees with a usual source of care had been with those physicians for a significantly longer time than enrollees in GHC and UHC, and were more likely to have internists, obstetrician/gynecologists and surgeons as their usual sources of care.

As expected, a significantly higher percentage of UHC enrollees named a PCP, as their usual source of care and, probably because the plan was new, they had not been patients of those physicians for as long as enrollees in BC or GHC. However, a significantly higher percentage of UHC enrollees had visited their usual source of care after July 1978 compared with enrollees in the other two plans.

GHC had significantly higher percentages of enrollees naming family practitioners and general practitioners as their usual source of care. Access to care as measured by waiting for appointments and travel time was appreciably higher in GHC than the other two plans, suggesting that GHC enrollees may be more dissatisfied with their providers than the enrollees in the other two plans. However, BC enrollees reported significantly longer office waiting time than enrollees in the other two plans. UHC enrollees appeared to have the best access as indicated by the fewest days until an appointment and shortest travel and office waiting times (Table VI-9).

The plan and the usual source of care's control over referrals was indicated by a significantly higher percentage of GHC enrollees stating that they desired referrals to other physicians than UHC enrolles who in turn desired more referrals than BC enrollees. BC enrollees had a higher number of nonreferred visits (in particular significantly higher visits to surgeons, allergists, dermatologists and ophthalmologists) than either other plan.

Satisfaction Across Plans

One of the outcome variables of interest was satisfaction; this was examined as satisfaction with the plan, satisfaction with out-of-pocket costs and satisfaction with the usual source of care. Satisfaction with the plan was elicited during the household interview, conducted nine to 18 months after the 1978 enrollment. Therefore, UHC enrollees had 9 to 18 months of experience with UHC whereas BC and GHC enrollees had been with their respective plans for a longer period of time.

Overall, most families were satisfied with their plan: UHC enrollees were most satisfied and BC enrollees were least satisfied (Table VI-10). As expected, BC enrollees were dissatisfied with their out-of-pocket costs and they were significantly more likely to consider switching plans during

TABLE VI-10
SATISFACTION BY PLAN
(FAMILY-BASED)

Variable	Family-Based BC (N= 561)	GHC (N= 397)	UHC (N= 537)	P-value
Satisfaction with Plan 7/78-12/79				
Very Satisfied	40.8%	60.4%	78.5%	.00
Some Satisfied	42.6	33.1	18.3	
Some Dissatisfied	12.9	5.6	2.5	
Very Dissatisfied	3.6	1.0	.8	
Considered Switching in 1979				
No	57.2%	74.3%	83.1%	.00
To BC	0	5.3	5.4	
To GHC	5.2	0	2.0	
To UHC	12.7	7.6	0.2	
Other/Multiple Plans	25.0	12.8	9.3	
Satisfaction with Out-of-Pocket Costs Since 1/1/79				
About Right	71.8%	80.1%	92.5%	.00
Too High	16.4	11.6	3.9	
Much Too High	11.9	8.3	3.6	

Variable	Person-Based BC (N=1316)	GHC (N= 950)	UHC (N=1287)	P-value
Satisfaction with Usual Source of Care				
No USC or Didn't Visit	25.6%	24.8%	20.1%	.00
Very Satisfied	61.6	47.7	65.6	
Satisfied	10.6	21.4	11.2	
Dissatisfied	1.5	5.0	2.4	
Very Dissatisfied	.7	1.2	.8	

the 1979 open enrollment than GHC and UHC enrollees. BC and UHC enrollees were satisfied with their usual source of care whereas GHC enrollees were most dissatisfied. Satisfaction with the plan or out-of-pocket costs and consideration of switching during the 1979 open enrollment were not associated with use of the plan (correlations were near zero and non-significant). However, satisfaction with usual source of care was correlated with both inpatient ($r = .05$, $p < .01$) and outpatient ($r = .13$, $p < .001$) use of services.

Differences in Percentage of Enrollees Ever Using Services Across Plans

To compare the percentage of enrollees who used any reimbursed or covered services across plans, we examined use only for enrollees with a full 18 months exposure to the plans. By using enrollees who were in the plans during the entire study we could more accurately assess any use of services. If we had examined use for enrollees with less than full tenure in the study, our adjustment technique may have artificially lowered or raised the percentage using services. Table VI-11 shows that a significantly lower percentage of BC enrollees used any services during the study or had any outpatient visits or visits to PCPs than GHC and UHC. The Seattle Prepaid Healthcare Study (Richardson et al., 1976) also found that the King County Medical/BC plan had a significantly lower percentage of enrollees using services than GHC.

This difference in outpatient reimbursed or covered use may not reflect total outpatient use. BC enrollees may not have submitted claims unless the deductible was met, thereby giving the impression of lower use. The data available do not permit us to estimate the percent of BC enrollees who used services but did not submit claims. Therefore, the results in Table VI-11 should be considered as in-plan reported use of services.

There was no significant difference across plans in the percent of enrollees having had at least one hospitalization. It is unlikely that under-reporting occurred for BC enrollees because we have evidence from our six-month follow-up interviews that BC enrollees submitted claims for virtually all hospital admissions. However, we might not have been able to detect significant differences in hospital admissions across plans due to small sample sizes.

Based on 95-percent confidence intervals (Volume II, Appendix VI.4), we can be reasonably certain that the percent using any services is higher in GHC and UHC as compared to BC and this difference may be up to 23 and 21 percentage points higher, respectively. Similar differences are supported by the data when considering the occurence of any outpatient visits; GHC and UHC differed from BC in the percentage of

TABLE VI-11
ENROLLEES* USING ANY REIMBURSED OR COVERED SERVICES BY PLAN

Variable	Age-Sex Adjusted Percents			Significance**		
	BC (N=1269)	GHC (N=887)	UHC (N=1236)	BC-GHC	BC-UHC	BC-UHC
Any services	70%	90%	88%	§	§	
Any outpatient visits	65	90	87	§	§	†
Any outpatient PCP visits	39	75	84	§	§	§
Any hospital admissions	7	6	9			

*This table includes only eligible enrollees with a full 18 months of exposure to a plan.

**Significance levels
† $p \leq .05$
∫ $p \leq .01$
§ $p \leq .001$

enrollees having visits by up to 28 and 25 percentage points, respectively. The 95-percent confidence intervals for the percentage having at least one hospital admission indicate that the plans differ in both directions by no more than five percentage points.

Differences in Use of Services Across Plans

Measurement of Use

One of our major methodological tasks was to define comparable measures of use across plans. We measured in-plan use in two ways: (1) counts of admissions and visits, and (2) volume or intensity of services used.

Counts of Admissions and Visits. The number of hospital admissions were counted for each plan. BC and GHC admissions were straightforward counts; however, UHC admissions were reported by days at a given level of care, e.g., intensive care unit or semi-privatae room, within one hospital admission. For this reason we reviewed all UHC cases which involved hospitalizations and manually created admission counts and lengths of stay. We believe that this resulted in a count of UHC admissions and length of stays which are comparable to those of BC and GHC.

It is difficult to count the number of visits because claims data are procedure-based. For this reason we defined a visit based on procedure codes. Current Procedural Terminology (CPT) or California Relative Value Scale (CRVS) procedure codes were chosen to define visits in the office, home, emergency room, hospital, critical care unit, skilled nursing facility, nursing home, and for well baby visits, psychiatric visits, ophthalmology visits, physical medicine visits and visits to consultants. We included visits to physicians and non-physicians such as Medex, chiropractors, etc. We excluded encounters for anesthesia, laboratory procedures, radiology procedures and telephone calls. Flat fee billing was used for some services such as prenatal care, certain surgical treatments, and allergy diagnosis and treatment in which one procedure code was given for a number of physician visits. We estimated the number of procedures associated with each flat fee. (Methods for counts of admission and visits using procedures described in Volume II, Appendix VI.5.)

Admission and visits are presented as annualized rates in the descriptive tables. All data are age-sex adjusted using the combined BC, GHC and UHC groups as the standard reference population. We believe the use of this combined standard population yields less biased results than choosing any one plan as the standard. Adjustment was performed using four age groups (0-5, 6-18, 19-44, 45-71) and sex (male, female). There were few important differences between adjusted and unadjusted rates.

Standardized Volume. In addition to counts of services, we wanted to indicate the intensity of services provided by each plan to each enrollee. Procedure-specific data, coded using CRVS or CPT procedure codes, were available from the BC and UHC claims files and we abstracted the same information from GHC medical records. Excluding pharmacy claims because their enumeration was very inconsistent across plans, we assigned to each claim procedure a weight equal to the CRVS unit value corresponding to its procedure code.*

Because CRVS units are assigned according to different scales for procedures in the medical, surgical, radiological, laboratory and anesthesia categories of services, we sought a weighting scheme by which procedures in different categories could be compared and aggregated to yield total use of services. The CRVS schedule provides just such a weighting method, in the form of a dollar-to-unit ratio for each of the procedure types. We used these weights--and those of the Rand Corporation, derived from their study of the Seattle area in 1978 and 1979--in preliminary estimates, but finally elected to use our own schedule of weights, calculated from average BC charges broken down by inpatient and outpatient use, since we felt that BC charges most accurately represented the standard charges in the Seattle area for providers during the period of the study. Indeed, a list of corresponding weights derived from UHC charges was not appreciably different.

Multiplying the CRVS units of each procedure found in the claims data by its appropriate weight, we calculated, for each procedure, a proxy measure of intensity, expressed as imputed dollars. These imputed dollars cannot be interpreted as estimates of actual costs, nor can they be used in any comparison of cost of production or efficiency, since they are actually procedure-code-specific measures of intensity. All claims having the same procedure code, whether in BC, UHC or GHC, were assigned the same imputed dollar value. Our method additionally controls for the effects of inflation for the same reason, since claims bearing the same procedure code, regardless of when the services were performed, carry the same imputed dollar amount. The imputed dollar amount of a particular procedure, then, might best be thought of as roughly equal to the average BC charges for that procedure over the full period of the study. It is with this in mind that we refer to the sum of imputed dollars for each enrollee as the "standardized volume". (Details of the derivation of imputed dollars and standardized volume are described fully in Volume II, Appendix VI.5.)

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*Some of our procedure codes did not appear in the CRVS schedule and did not have units assigned to them. We employed a number of techniques, including regression and a nearest neighbor approach, to assign CRVS-compatible unit values to codes not previously scaled. These techniques are described fully in Volume II, Appendix VI.5.

After calculating a raw standardized volume for each enrollee, by summing the imputed dollars of each of the enrollee's claims during the study period, we produced an annual standardized volume based upon the enrollee's length of time in the study. Because some enrollees had no use of services and others had a very high standardized volume, we used log transformations to control for skewing. After testing a number of transformations we found that log (standardized volume + 10) was the most appropriate for our data (see Volume II, Appendix VI.6 for more details).

In-plan use of services based on reported claims data should be comparable in counts and procedures coding between BC and UHC because virtually the same physicians belong to BC and UHC and they or their clerks fill out claims forms for both plans. BC in-plan use may be slightly underestimated because enrollees may not have submitted some claims for covered services. In training of abstractors at GHC we tried to mitigate the differences between abstracting medical records and filling out claims forms. However, GHC abstractors coded a higher percentage of physician visits as brief than were coded at BC and UHC. We believe this difference to be an artifact of abstracting from medical records versus claims forms and have tried to correct for this by first examining the in-plan use data as collected and secondly analyzing it using the same percentage of brief visits at GHC as in BC and UHC. The standardized volume in the tables represent GHC in-plan brief visits as abstrcted without adjustment. Adjustment increases GHC rates by approximately 10.9 percent.

In general, all three plans had complete information for outpatient claims and procedures. GHC inpatient procedures were more detailed because we had abstracted information from medical records. Hospital claims at BC and UHC were not itemized for certain types of procedures, i.e., laboratory, radiology and administrative services. In an attempt to disaggregate these lump sum inpatient charges, we used a regression approach to assign procedure codes and eventually weight each type of procedure category, e.g., supplies and administrative (Volume II, Appendix VI.5). We used itemized hospital claims as our criterion for assigning weights. Using this method, we believe the inpatient standardized volumes are comparable across plans.

Reimbursement or covered in-plan use is presented for inpatient services, outpatient services, PCP outpatient services and total use of services.

Inpatient Use

Distributions for total number of admissions and number of patient days were skewed (Volume II, Appendix VI.7). Two GHC enrollees had an appreciably higher number of admissions or patient days than other people in the sample. One young male with hypertensive renal disease had 14 one- or two-day admissions for renal function tests within 18 months for a total of 17 patient days. A young female with anorexia nervosa had one admission of 118 days. These two cases are included in the tables presented in the text but are excluded from inpatient analyses for GHC in Volume II, Appendix VI.8.* The exclusion of these two extreme cases decreases the number of admissions and patient days for GHC but GHC rates are still not significantly different from BC and UHC.

There were no significant differences among the plans in number of admissions, patient days or average length of stay for total admissions or for non-obstetrical admissions only (Table VI-12a). Because our sample size is small and hospitalization is a relatively rare event we would only be able to detect a sizeable difference among plans in hospital use. However, the non-significant differences presented here may have had important efects for the plans. UHC had the highest number of admissions but the lowest average length of stay and low intensity of services per day. BC had the lowest admission rate but high intensity of services per day. GHC had the lowest intensity of services per day.

The highly variable inpatient data support large, though non-significant, differences (in both directions) among the plans. Based on 95-percent confidence intervals the difference between BC and GHC may be as large as 36 admissions per 1,000 persons annually. Similarly, UHC and GHC could differ by up to 29 admissions per 1,000 persons annually. BC and UHC inpatient data are somewhat less variable although differences in underlying admission rates may be as large as 29 admissions annually per 1,000 persons. In terms of number of hospital days, the data support differences between GHC and both BC and UHC of more than 309 days per 1,000 persons while it is unlikely that BC and UHC differ by more than 108 days. For users of inpatient services we can be 95-percent confident that the average length of stay for GHC patients would be no more than eight days longer than BC and UHC, although underlying differences this large are supported by the data. It is unlikely that the difference between BC and UHC is more than one day in either direction. Almost indentical confidence interval patterns are observed for non-obstetric admissions although the intervals are slightly smaller.

When we look only at inpatient users, we find that total inpatient standardized volume is significantly lower for UHC ($904) than BC ($1,251) (Table VI-12b). When standardized

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*These two cases are included in the outpatient analyses because their outpatient use was not different from that of other enrollees.

TABLE VI-12 a
INPATIENT USE BY PLAN*

Variable	Age-Sex Adjusted Rates			Significance**		
	BC (N=1316)	GHC (N=950)	UHC (N=1287)	BC-GHC	BC-UHC	GHC-UHC
Total admissions/ 1,000 person years	57	65	68			
Total hospital days/ 1,000 person years	257	344	257			
Total admissions average length of stay	4.12	6.56	3.83			
Total non-OB admissions/ 1,000 person years	54	56	61			
Total non-OB days/1,000 person years	252	313	231			
Number hospital admissions with operating room use/ 1,000 persons years	42	36	40			

*This table includes eligible people with at least 12 months of exposure to the plans during the study. It also includes two GHC enrollees who were defined as inpatient outliers.

**None of the measures of inpatient use are statistically significant ($p<.05$) between plans.

TABLE VI-12 b
INPATIENT STANDARDIZED VOLUME FOR USERS* BY PLAN

Variable	Age-Sex Adjusted Rates Per Person Year			Significance**		
	BC (N= 98)	GHC (N= 64)	UHC (N=111)	BC-GHC	BC-UHC	GHC-UHC
Total inpatient standardized volume	$1,251	$1,293	$ 904		†	
Inpatient medical procedures standardized volume	51	101	22		∫	∫
Inpatient surgicial procedures standardized volume	526	240	298	§	§	
Inpatient x-ray procedures standardized volume	35	23	68		§	§
Inpatient laboratory procedures standardized volume	29	47	13	†	§	§
Inpatient visit standardized volume	22	52	17	†		∫
Inpatient standardized volume/day#	441	305	376	§	†	∫

*This table includes eligible people with at least 12 months of exposure to the plans during the study and having at least one hospital admission. It also includes two GHC enrollees who were defined as inpatient outliers.

**Significance levels

† $p \leq .05$
∫ $p \leq .01$
§ $p \leq .001$

#These rates are unannualized.

volume is examined by type of procedure,* we see that GHC has the highest standardized volume for medical and laboratory procedures and inpatient visits, whereas BC is significantly higher than the other two plans in surgical volume. UHC has the highest standardized volume for radiologic procedures. There is also evidence of these general trends when we look at standardized volume for the total sample (Table VI-12c).

For inpatient services users, 95-percent confidence intervals indicate that differences in annualized standard volume may be as large as $633 comparing BC with UHC (BC larger) and up to $1039 comparing GHC with UHC (GHC larger). Differences between BC and GHC of up to $717 in either direction are also supported by these data. For all enrollees, inpatient differences in standard volume are unlikely (95-percent confidence) to be larger than $52 annually.

There were significant differences among plans for obstetric admissions (Table VI-13). BC had significantly fewer obstetric admissions and patient days than GHC and UHC. Although UHC enrollees had significantly higher average length of stay for obstetric patients than BC, their cost per day was significantly lower than GHC and BC. BC, which had the lowest average length of stay, had the highest intensity of services per obstetric day. However, when we look at intensity per obstetric admission (total obstetric standardized volume divided by obstetric admissions) we see no difference across plans.

Outpatient Use

We examined number of visits and standardized volume of services for ambulatory use covered by the plans. UHC and GHC have a significantly higher number of total ambulatory visits per year than BC (Table VI-14). When we look at visits broken down by type of provider we see that UHC physician visits are significantly higher than those of GHC, which in turn is significantly higher than those of BC. This same pattern is seen for PCP visits. UHC had significantly fewer specialist visits and significantly fewer visits to non-physicians compared with the other two plans. This suggests that the UHC plan was working as designed: enrollees made more visits to PCPs and limited their visits to specialists.

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*Procedures were categorized into five types. The following are examples of procedures in each category: (1) medical--immunizations, dialysis, catherization and chemotherapy; (2) surgical--appendectomy, mastectomy, endoscopy and biopsy; (3) radiologic--computerized tomography, mammography and ultra sound; (4) laboratory--urinalysis, chemistry and pap smear; and (5) visits--all CRVS 90000's codes such as new patient visits and established patient visits of varying lengths.

TABLE VI-12c
INPATIENT STANDARDIZED VOLUME FOR TOTAL SAMPLE* BY PLAN

Variable	Age-Sex Adjusted Rates Per Person Year			SIGNIFICANCE**		
	BC (N=1316)	GHC (N=950)	UHC (N=1287)	BC-GHC	BC-UHC	GHC-UHC
Total inpatient standardized volume	$90	$86	$77			
Inpatient medical procedures standardized volume	4	7	2			
Inpatient surgical standardized volume	38	17	26	§		
Inpatient x-ray standardized volume	3	2	6		§	§
Inpatient laboratory standardized volume	2	3	1		ʃ	ʃ
Inpatient visit standardized volume	2	3	2			

*This table includes eligible enrollees with at least 12 months of exposure to the plan during the study. This includes two GHC enrollees who were defined as inpatient outliers.

**Significance levels

† $p \leq .05$

ʃ $p \leq .01$

§ $p \leq .001$

TABLE VI-13
OBSTETRICAL INPATIENT USE* BY PLAN

	Age-Sex Adjusted Rates			Significance**		
Variable	BC (N= 362)	GHC (N= 298)	UHC (N= 358)	BC-GHC	BC-UHC	GHC-UHC
Total OB admissions/ 1,000 person years	7.90	31.02	24.49	†	†	
Total OB days/1,000 years	17.77	100.44	92.89	∫	∫	
Average length of stay for OB	2.18	3.18	3.73		†	
OB inpatient standardized volume/OB day	$439.50	$330.09	$267.84	†	∫	§
OB inpatient standardized volume/OB admission	905.25	1,056.36	1,026.31			

*This table includes eligible females between the ages of 15 and 44 and having at least 12 months of exposure to the plan during the study.

**Significance levels

† $p \leq .05$

∫ $p \leq .01$

§ $p \leq .001$

TABLE VI-14
OUTPATIENT USE BY PLAN*

Variable	Age-Sex Adjusted Rates Per Person Year			Significance**		
	BC (N=1316)	GHC (N=950)	UHC (N+1287)	BC-GHC	BC-UHC	GHC-UHC
Total ambulatory visits	3.12	3.94	3.65	§	∫	
Ambulatory visits to all physicians	2.12	2.79	3.44	§	§	§
Ambulatory visits to non-MDs	1.01	1.15	.21		§	§
Ambulatory visits to PCPs	.95	1.78	2.76	§	§	§
Ambulatory visits to specialists	1.16	1.01	.68		§	∫

*This table includes eligible enrollees with at least 12 months of exposure to the plan during the study.

**Significance levels

† $p \leq .05$

∫ $p \leq .01$

§ $p \leq .001$

UHC had significantly fewer visits to non-physicians than BC or GHC but these differences may be due to variation across plans in benefits covering the use of non-physicians. As defined by BC, non-physicians include chiropractors, naturopaths, optometrists, psychologists, social workers, nurse practitioners and Medex. GHC non-physician visits are provided primarily by nurse practitioners, Medex, psychologists, psychiatric social workers and optometrists. UHC covers visits to optometrists, psychologists, chiropractors and nutritionists.

Standardized volume for outpatient services for BC and UHC are very similar and significantly higher than GHC for total services and volume broken down by procedure type (Table VI-15). This pattern is also evident when we look at the volume of services per visit (average outpatient visit standardized volume divided by the number of visits). However, when we look at the intensity of services per visit (total outpatient standardized volume divided by visits), we see that BC is significantly higher than UHC which is in turn significantly higher than GHC.

Overall, it appears that GHC had the highest rate of ambulatory visits but the lowest intensity of services per visit; BC had the lowest rate of visits with the highest intensity of services; and UHC rates and volume were between those of BC and GHC.

How can we explain these differences in outpatient intensity of services across plans? First, one must consider whether these are real differences or if they are an artifact of our study. We are convinced that the data were handled comparably during data cleaning and analysis. There is some question about the comparability of abstracting and coding procedures from medical records compared with procedures obtained from claims. Abstractors may not code data in the same manner as office clerks in the fee-for-service sector. However, the investigators in this project and GHC have had experience in training abstractors to do similar types of abstracting in previous studies which have compared the closed-panel plan with the fee-for-service sector. We compared several procedures across plans and only brief visits appeared noticeably different. GHC believes that their medical records are complete and accurately reflect care given to their patients. BC and UHC believe their claims systems provide incentives for physicians to bill for all procedures and for enrollees to submit claims. If there is a fee-for-service tendency for "procedural inflation", i.e., to bill for services rendered as a more intensive procedure, it has not been documented in previous studies comparing GHC with other plans.

Second, if these are real differences how can they be explained? One explanation is that the economics of BC and

TABLE VI-15
OUTPATIENT STANDARDIZED VOLUME FOR USERS BY PLAN*

	Age-Sex Adjusted Rates Per Person Year			Significance**		
Variable	BC (N=908)	GHC (N=854)	UHC (N-1133)	BC-GHC	BC-UHC	GHC-UHC
Total outpatient standardizied volume	$224.15	$112.33	$188.04	§	∫	§
Outpatient medical procedures standardized volume	29.91	5.46	21.18	§	∫	§
Outpatient surgical procedures standardized volume	28.83	6.24	26.56	§		§
Outpatient x-ray procedures standardized volume	31.81	10.11	26.12	§		§
Outpatient laboratory procedures standardized volume	26.65	16.72	22.09	§	∫	§
Outpatient visit standardized volume	105.86	73.31	87.25	§	†	§
Mean outpatient standardized volume/ visit#	55.15	24.65	48.10	§	∫	§
Mean outpatient visit standardized volume/ visit#	21.33	15.99	21.11	§		§

*This table includes eligible enrollees with at least 12 months of exposure to the plan during the study and having some outpatient use of services.

**Significance levels

† $p \leq .05$
∫ $p \leq .01$
§ $p \leq .001$

#These are unannualized rates and only includes enrollees with visits: BC=858, GHC=853, UHC=1111.

UHC fee-for-service reimbursement provide a strong incentive for performing and reporting more intensive procedures. An alternative explanation is that GHC physicians who are salaried are holding down costs in the plan by providing fewer procedures to patients. In addition, the ratio of specialists to PCPs at GHC is much lower than in the fee-for-service sector and specialists tend to use high intensity procedures.

PCP Outpatient Standardized Volume

Our definition of PCP varies across the plans, reflecting each plan's use of PCPs. For UHC and BC, we define PCPs as general and family practitioners, pediatricians, internists, osteopaths and obstetrician/gynecologists. For GHC, we define PCPs as family practitioners, general practitioners, pediatricians and osteopaths. Internists at GHC were excluded because for the most part they deliver specialty care. Obstetrician/gynecologists were excluded because most gynecologic problems are handled by general practitioners and patients usually cannot self-refer to obstetrician/gynecologists unless they require obstetrical services which are rarer than gynecologic use in the population. Although this is the PCP definition used in this paper, we tested three alternative definitions. A discussion of our testing of these definitions can be found in Volume II, Appendix VI.9.

We present only PCP outpatient use results because our inpatient sample may have been too small to detect differences among plans. Also, PCPs presumably have greater control over use of outpatient than inpatient services because consultations from specialists during hospitalizations are more frequent.

Table VI-16 presents outpatient services provided by PCPs. As stated above, the plans differed significantly from each other in number of visits to PCPs each year: UHC enrollees had the highest number of visits to PCPs followed by GHC and BC enrollees. The same ordering of plans holds when we look at PCP visits as a percent of physician visits or as a percent of total outpatient visits. Unfortunately, our data do not allow us to determine whether the higher UHC PCP visit rates are patient- or physician-generated.

We also examined the volume of services performed by PCPs. UHC standardized volume is significantly higher than BC or GHC for each procedure type. After a cursory examination, it appears that UHC's higher standardized volume is due to UHC PCPs performing more low intensity services rather than performing a few highly intensive procedures.

TABLE VI-16
PCP OUTPATIENT USE* BY PLAN

	Age-Sex Adjusted Rates Per Person Year			Significance**		
Variable	BC (N=1316)	GHC (N=950)	UHC (N=1287)	BC-GHC	BC-UHC	GHC-UHC
Total outpatients visits to PCPs	.95	1.78	2.76	§	§	§
PCP visits as percent of outpatient visits#	39%	52%	81%	§	§	§
PCP outpatient medical standardized volume	$4.59	$1.95	$10.24	ʃ	§	§
PCP outpatient surgical standardized volume	3.33	1.32	7.57	ʃ	ʃ	§
PCP outpatient x-ray standardized volume	2.23	NA##	6.86		§	
PCP outpatient laboratory standardized volume	6.73	NA##	13.50		§	
PCP outpatient visits standardized volume	18.61	27.24	54.90	§	§	§

*This table includes eligible enrollees with at least 12 months of exposure to the plan during the study.

**Significance levels

† p ≤ .05
ʃ p ≤ .01
§ p ≤ .001

#Enrollees were included in these analyses only if they had an outpatient visit (BC=858, GHC=853, UHC=1111).

##GHC x-ray and laboratory data were not collected with provider specialty so PCPs could not be differentiated from other providers.

Total Standardized Volume

As shown in Table VI-17, there was no difference across plans for total inpatient and outpatient standardized volume of services, although once again BC and UHC had respectively similar average total volume ($246 and $243, respectively) whereas GHC was lower (at $185 or $168, when outliers were excluded). Calculating 95-percent confidence intervals for total standardized volume, we find that BC and UHC differ by probably no more than $43 in either direction, while GHC may be up to $114 less than BC and UHC.

Standardized Volume and Out-of-Pocket Costs Before and After July 1978

We used a quasi-experimental design to examine the effect of plan on standardized volume of services and out-of-pocket costs for six-months before the 1978 open enrollment and for 18 months after the 1978 open enrollment.* By examining the same people in each time period, this design allows us to control for personal characteristics while studying intensity of services and out-of-pocket costs.

Standardized Volume

The top half of Table VI-18 shows annual rates for in-plan standardized volume at BC or GHC before the July 1978 open enrollment. Enrollees switching from BC or GHC to UHC had the same or lower standardized volume than enrollees who remained with the respective plans. Therefore, based on prior use of services, UHC had favorable selection and we expected switchers to have lower standardized volumes after switching to UHC than enrollees who remained with BC or GHC.

When we compare standardized volumes before and after July 1978, enrollees who switched to UHC significantly increased their total volume of services, whereas enrollees who remained with BC or GHC decreased, but not significantly, standardized volume of services. Enrollees who remained with BC had 47 percent lower inpatient standardized volume and only a slightly lower (4 percent) outpatient standardized volume after July 1978 than they had before July 1978. GHC enrollees' inpatient standardized volume remained approximately the same (+2 percent) but their outpatient standardized volume decreased significantly by 20 percent. There were no significant differences in PCP standardized volume during the period after the 1978 open enrollment,

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*We used the dates of service rather than the date of claim submission whenever it was necessary to analyze use or cost by time periods.

TABLE VI-17
STANDARDIZED VOLUME BY PLAN*

Variable	Age-Sex Adjusted Rates Per Person Year			Significance**		
	BC (N=1316)	GHC (N=950)	UHC (N=1287)	BC-GHC	BC-UHC	GHC-UHC
Inpatient standardized volume	$ 90	$ 86[#]	$ 77			
Outpatient standardized volume	155	100	166	§		§
Total standardized volume	245	186[#]	243	†		†

*This table includes eligible people with at least 12 months of exposure to the plans during the study. It also includes two GHC enrollees who were defined as inpatient outliers.

**Significance levels

† $p \leq .05$

ʃ $p \leq .01$

§ $p \leq .001$

[#] Standardized volumes excluding the two GHC inpatient outliers are $68 for inpatient standardized volume and $168 for total standardized volume.

TABLE VI-18
STANDARDIZED VOLUME BEFORE AND AFTER JULY 1978*

	Age-Sex Adjusted Rates Per Person Year				Significance**					
	BC (N=1288)	GHC (N=921)	BC-UHC (N=941)	GHC-UHC (N=319)	BC-GHC	BC -(BC-UHC)	BC - (GHC-UHC)	GHC-(BC-UHC)	GHC - (GHC-UHC)	(BC-UHC)-(GHC-UHC)
Before July 1978										
Inpatient standardized volume	$165	$ 85$^{\#}$	$ 97	$ 34			†			
Outpatient standardized volume	162	123	115	103	∫	§	§			
Outpatient PCP standardized volume	31	34	31	31						
Total standardized volume	326	208$^{\#}$	212	137			∫			
After July 1978										
Inpatient standardized volume	$ 87	$ 87$^{\#}$	$ 81	$ 50			†			
Outpatient standardized volume	155	98	164	168	§			§	§	
Outpatient PCP standardized volume	36	30	92	110	†	§	§	§	§	†
Total standardized volume	242	186$^{\#}$	245	217	†			†		

TABLE VI-18 (continued)

	Age-Sex Adjusted Rates Per Person Year				Significance**					
	BC (N=1288)	GHC (N=921)	BC-UHC (N=941)	GHC-UHC (N=319)	BC-GHC	BC-(BC-UHC)	BC-(GHC-UHC)	GHC-(BC-UHC)	GHC-(GHC-UHC)	(BC-UHC)-(GHC-UHC)
Percent Change Before & After July 1978										
Inpatient standardized volume	-47%	+2%	-16%	+47%						
Outpatient standardized volume	-4	-20 †	+43 §	+63 §		†	∫		†	
Outpatient PCP standardized volume	+16	-12	+197 §	+255 §		§	§	§	§	
Total standardized volume	-26	-11	+16	+58 †						

*This table includes eligible enrollees with six months of exposure to the plan before July 1978 and at least 12 months of exposure to the plan after July 1978. The two GHC inpatient outliers are included.

**Significance levels are given for differences between plans and for percent changes before and after July 1978.
† $p \leq .05$
∫ $p \leq .01$
§ $p \leq .001$

#Excluding the two outliers from the GHC analysis results in the following changes (N=919):

Before July 1978	
GHC inpatient standardized dollars:	$ 62
GHC total standardized dollars:	179
After July 1978	
GHC inpatient standardized dollars:	$ 69
GHC total standardized dollars:	167

These exclusions did not change the significance.

although BC PCP volume increased and GHC PCP volume decreased.* (See Appendix VI.4 for 95-percent confidence intervals of percent change before and after July 1978.)

Total standardized volume increased significantly for UHC enrollees who switched from GHC by 58 percent but only increased 16 percent (not significant) for enrollees who switched from BC. The percent changes in inpatient use of services were non-significant and negative (-16 percent) for former BC enrollees and in a positive direction (+47 percent) for former GHC enrollees.

Enrollees from BC or GHC who switched to UHC had large and significant standardized outpatient volume increases, 43 percent and 62 percent, respectively. But the most dramatic increases occurred for PCP services. PCP standardized volume increased 197 percent for former BC enrollees who switched to UHC and 255 percent for former GHC enrollees who switched to UHC.

In summary, when enrollees from BC and GHC switched to UHC intensity of services used increased appreciably. These increases were most pronounced (and statistically significant) for PCP services and other outpatient care. There was also a large, though non-significant increase in inpatient standardized volume for former GHC enrollees, whereas there was a non-significant decrease in inpatient standardized volume for former BC enrollees. For each type of services enrollees who switched from GHC to UHC had greater percentage change in standardized volume than enrollees who switched from BC to UHC.

Unfortunately, our study cannot determine whether these increases in standardized volume were due to unmet need from enrollment in previous plans or were due to ineffective control by the UHC system and participating PCPs. Chapter V provides some evidence that people switched plans because they needed or wanted care.

Out-of-Pocket Costs

To determine out-of-pocket costs before the 1978 open enrollment period we used a retrospective approach. The information was collected during the household interview, i.e. the subscriber was asked to recall (with the help of records) out-of-pocket expenses for the entire family for the six months prior to the 1978 open enrollment. Because the interviews were conducted between April 1979 and January 1980, subscribers were asked to recall expenses up to 24 months after they had occurred. To create a crude indicator of out-of-pocket costs prior to the 1978 open enrollment we annualized this amount by multiplying by two to create a family indicator and then divided this measure by the average family size to obtain out-of-pocket costs per person.

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*The pre-7/78 period covers the first six months of the year when BC enrollees may not have met the deductible or submitted all claims so we might have underestimated BC standardized volume before 7/78 compared to the other plans or compared to the standardized volume after 7/78 for BC enrollees. Therefore, the bias is in the opposite direction from the expected result and provides a conservative estimate.

We obtained information about out-of-pocket costs after the 1978 open enrollment using the prospective approach employing the calendar/diary and follow-up interviews. Total family out-of-pocket costs were collected for a six-month period and were annualized by dividing by the total number of follow-ups and multiplying by 12. Average annual family out-of-pocket costs were then divided by the average family size to obtain a crude indicator of per person out-of-pocket costs. (A detailed discussion of the definition, annualization, and person-based out-of-pocket costs is given in Volume II, Appendix VI.10.)

We assume that the out-of-pocket costs obtained by using the prospective approach were more reliable and valid than out-of-pocket costs obtained retrospectively. However, even the prospective approach may have underestimated the out-of-plan use and out-of-pocket costs for BC enrollees compared with UHC and GHC enrollees. BC enrollees were asked to record all use of services and out-of-pocket costs whereas GHC and UHC enrollees were asked to record out-of-plan use only and associated out-of-pocket costs. It may have been more difficult for BC enrollees to recall out-of-pocket costs than for UHC and GHC enrollees to to do so because of the claims submission and administrative procedures at BC.

Table VI-19 provides the annualized average out-of-pocket costs per person after the 1978 open enrollment. As expected, BC enrollees have a higher annualized out-of-pocket cost than GHC or UHC enrollees. BC out-of-pocket costs reflect the $50 per person deductible, the 10 percent coinsurance and any unsubmitted claims, whereas out-of-pocket costs in GHC and UHC primarily reflect out-of-plan use of services. Neither premium costs nor the $1.60 per month payroll deduction for GHC were included in the payroll deduction. Therefore, these out-of-pocket costs reflect differences in plan benefits and out-of-plan use of services.

Table VI-19 also compares annualized out-of-pocket costs per person across plans before and after July 1978. Out-of-pocket costs decreased for enrollees remaining with BC after the 1978 open enrollment and increased for GHC enrollees. As expected due to the plans' coverage, BC enrollees switching to UHC decreased their out-of-pocket costs whereas enrollees switching from GHC to UHC increased their out-of-pocket costs.

TABLE VI-19
ANNUALIZED OUT-OF-POCKET COSTS PER PERSON BEFORE AND AFTER JULY 1978 BY PLAN*

Annualized** Out-of-Pocket Costs	BC	GHC	UHC-BC	UHC-GHC
Before July 1978				
Family Mean	$241.93	$42.42	$255.91	$56.70
S.D.	457.34	138.74	562.90	117.02
Person Average	103.38	17.82	104.88	24.55
After July 1978				
Family Mean	$176.16	$68.28	$106.93	$87.45
S.D.	1,014.21	505.29	944.88	505.10
Person Average	75.28	28.69	43.82	37.86
Number of Families	506	372	361	141
Average Family Size	2.34	2.38	2.44	2.31

*This table includes enrollees with non-missing out-of-pocket cost information for both before and after July 1978.

**Out-of-pocket costs are calculated from family household interview data (before July 1978) and from monthly family follow-ups. See Volume II, Appendix VI.10 for a detailed discussion of methods.

Summary of Univariate Results

We had expected that UHC would attract people who tend to use more services because it was a new plan with freedom of choice of a PCP and comprehensive coverage. However, based on the variables examined in the univariate analysis, there is no evidence that UHC attracted higher risk enrollees. UHC attracted enrollees with lower use of services before the July 1978 open enrollment. The only indicator of potentially higher use was a high percentage of UHC enrollees who were white and who said they would contact a provider rather than ignoring or treating symptoms themselves.

BC and GHC enrollees were more likely to be high users of services. Indeed, they retained enrollees who had higher use of services before July 1978, perhaps because these enrollees were well-established within the respective plans and did not want to discontinue care. Based on sociodemographic variables related to use in previous studies, we would expect BC enrollees to use more services than GHC enrollees. BC had a higher percentage of enrollees who were older and white with high education and income levels. In addition, they had more days of limited activity. GHC had a higher percentage of enrollees who were younger, with more children, and had high levels of education. They reported more emotional problems than enrollees in other plans and had a moderate propensity to seek care from a provider rather than treating themselves or ignoring their systems.

Although UHC had favorable selection of enrollees into the plan, the plan experienced higher use of outpatient services than BC and GHC. UHC enrollees had more outpatient visits than enrollees in the other plans and these were high intensity visits: UHC had the highest average standardized volume per person per year for each procedure type. UHC enrollees had few visits to specialists and had a high number of visits to PCPs but the PCPs did more procedures or more complex procedures per visit than specialists.

BC and GHC use outpatient services in different ways. BC limits use of services by financial incentives, e.g., deductible and coinsurance, and has fewer visits yet those visits are high intensity. On the other hand, GHC provides more visits (including visits to PCPs) of low intensity.

UHC did not differ significantly from the other plans in number of admissions. However, once an enrollee was hospitalized, standardized volume per admission was lowest compared with BC and GHC.

Standardized volume before and after the July 1978 open enrollment provide further evidence of the UHC plan effect. In general, enrollees who remained with BC and GHC decreased, although not significantly, their volume of services. But enrollees who switched to UHC significantly increased outpatient volume and dramatically increased their PCP standardized volume. BC switchers decreased inpatient use by 16 percent whereas GHC switchers increased inpatient use by 47 percent but neither percent change was significant. Total standardized volume increased for switchers from both plans but only significantly for GHC switchers, by 58 percent and 16 percent for GHC and BC switchers, respectively.

Thus, inpatient standardized volume is similar across plans (which may be due to the small sample size). The important plan differences are reflected in outpatient use: BC controls outpatient use by limiting the percent of enrollees using services (or submitting claims) but paying for more intensive care per visit; GHC controls use by providing many visits but limiting intensity or care per visit; and UHC controls use by limiting specialist visits but providing a large number of PCP visits which are of high intensity. As stated in an earlier section of this chapter, these findings should be evaluated considering the reliability and validity of the data and conclusions should be drawn only after considering the various alternative explanations.

Lastly, annual out-of-pocket cost was significantly higher for BC enrollees than GHC or UHC enrollees. These costs do not include premium payments but do reflect plan differences in enrollee cost sharing and out-of-plan use. BC enrollees are required to pay a $50 deductible and 10 percent coinsurance while having almost all types of care and types of providers covered. GHC and UHC have no deductible or coinsurance but require enrollees to seek care or approval for care from plan providers; thus, most of their enrollees' out-of-pocket costs may be attributed to out-of-plan use.

MULTIVARIATE ANALYSIS

One of the major goals of this study was to determine the effect of the plans on use of services. We presented age-sex adjusted rates of use across plans in the previous section. However, many factors other than age and sex which are related to use differ across the plans. Therefore, we performed multivariate analyses to reduce or explain the variability in use of services after controlling for a number of independent variables. In addition, we used multivariate analysis to examine interactions between the plans and other variables, such as age and health status. Finally, we developed plan-specific models of the use of services, which were summarized to provide a single model for all three plans. The analyses were restricted to the same population used in the univariate analyses: eligible enrollees who had completed the household interview and had at least twelve months of exposure to the plan (N = 3553).

The only dependent variables studied were: inpatient standardized volume (excluding and including two GHC outliers); outpatient standardized volume; outpatient PCP standardized volume; total standardized volume (excluding and including two inpatient outliers); any admission (yes/no); and any visit (yes/no).

The standardized volume dependent variables were annualized and transformed to their logarithms to reduce skewness. The annualized untransformed variables were also used. In general we present means of the untransformed data because of their easy interpretation; significance tests are based on the log transformed data, which fit the normality assumptions better. (The interpretation of transformed versus untransformed data is discussed further in Volume II Appendix VI.6.) Any substantive differences between transformed and non-transformed analyses are noted in the text.

The control variables chosen for this analysis are shown in Table VI-20. Although standardized volume was annualized, we also included exposure as a predicting variable to further control for the number of months in the plan. This was necessary because simply dividing by the number of months does not necessarily produce an indicator independent of exposure, and the log transformation may have allowed a dependence between use and exposure.

We routinely used five variables to represent age and sex in these analyses: Age, Sex, Age , AgexSex, Age xSex. This parameterization allows us to estimate a separate quadratic equation for males and females, allowing the relationship between age and use to be non-linear and different for males and females. In the following text we refer to "age, sex and their interaction terms" when we wish to refer to these five variables.

In addition to age, sex and exposure, we included sociodemographic characteristics and indicators of family structure, family resources, health status, propensity to seek care, health insurance coverage and past health care experience.

The plans are represented by two "dummy variables", BC and GHC. "BC" takes on the value of 1 if the enrollee is in that plan and 0 otherwise; "GHC" takes on the value of 1 for GHC enrollees and 0 otherwise. The category which is left out, UHC, is called the "reference category". UHC enrollees have a 0 value for both "BC" and "GHC".

Plan Effect

In this part of the analysis we attempted to eliminate the effects of potential confounding variables in order to obtain an estimate of the impact of the plan variable on the

TABLE VI-20

VARIABLES USED IN MULTIVARIATE ANALYSIS TO TEST PLAN EFFECT

STEP 1 OF REGRESSION

- Exposure
  - (months in plan during the study)
- Sociodemographic Characteristics
  - Age
  - Sex
  - Age^2
  - Age x sex
  - Age^2 x sex
  - Race
  - Type of employer
  - Length of time as state employee
  - Length of time as resident of King County
  - Subscriber and spouse both state employees
- Family Structure & Resources
  - Family composition
  - Family scale
  - Family size
  - Relationship to subscriber
  - Employment status
  - Subscriber education
  - Subscriber occupation
  - Family income
  - Availability of home care
- Health Status
  - Perceived health status
  - Comparative health status
  - Number of chronic conditions
  - Total number of disability days
  - Number of bed days
  - Number of limited activity days
- Propensity to seek care
  - Number of symptoms self-treated
  - Number of symptoms contact provider
- Past Health Care Experience (1/1/78-6/30/78)
  - Existence of out-of-pocket costs (1/1/78-6/30/78)
  - Amount of out-of-pocket costs (1/1/78-6/30/78)
  - Outpatient standardized volume (1/1/78-6/30/78)
  - Outpatient PCP standardized volume (1/1/78-6/30/78)
  - Total standardized volume (1/1/78-6/30/78)
  - Hospital admission ever (1/1/78-6/30/78)
  - Ambulatory visit ever (1/1/78-6/30/78)
  - Use ever (1/1/78-6/30/78)
- Health Insurance Coverage
  - Number of other health insurance plans

STEP 2 OF REGRESSION

- Plan
  - BC
  - GHC
  - (UHC is the reference category)

various measures of use. All of the control variables in Table VI-20 were entered on the first step of the regression to adjust for any differences in enrollee characteristics across plans. Dummy variables "BC" and "GHC" for plan were added in the second step.

Table VI-21 presents the results of plan effect on standardized volume, controlling for all of the variables in Table VI-20. The first three columns of the table show the estimated mean standardized volume for each dependent variable by plan. Both crude and adjusted means are shown. The latter were adjusted for difference in the covariates across the plans by using the mean values for the BC sample in the regression equation.

Significance tests in Table VI-21 are based on log-transformed data. The p-values refer to the significance of the dummy variable in the regression equation, and thus to the significance of the difference between UHC and the plan denoted by the dummy. (The use of dummy variables is explained further in Volume II, Appendix VI.12). The overall significance of the plan construct (as represented by both dummy variables taken together) is also tested. This is the result of an F-test of the null hypothesis that the means for all three plans are the same.

As an example, consider outpatient standardized volume, the first line of Table VI-21. The mean annual standardized volume (unadjusted) for BC was $158.16, compared to $99.94 for GHC and $164.98 for UHC. The overall plan effect was highly significant. When the individual dummy variables are examined, the GHC and BC dummy variables are significantly different from zero, meaning that both plans are significantly lower than UHC. This relationship is also observed in the second line of the table, where the data are adjusted for the various covariates. Since BC means were used, the adjusted value for BC remains at $158.16, while GHC increases to $109.87 and UHC increases to $173.07, suggesting that GHC and UHC had somewhat favorable selection on the covariates when compared to BC.

Findings presented in the table suggest that plan effect is highly significant for outpatient use as represented by standardized volume for total use, PCP use and per user and percent of enrollees using services. For the inpatient data there are no statistically significant plan differences perhaps owing to the high variability in the inpatient measure.

There are important differences in the distributions of visits and thus (untransformed) standardized volume in the three plans. In GHC nearly everyone has a visit, but the average intensity of each visit is relatively low. In BC, relatively few enrollees make a visit, but those who do have

TABLE VI-21

MULTIVARIATE RESULTS* OF PLAN EFFECT ON ANNUALIZED STANDARDIZED VOLUME

		Annualized Standardized Volume**		
Type of Service	Rate	BC	GHC	UHC
Outpatient #	Crude	$158.16	$ 99.94	$164.98
	Adjusted	158.16	109.87	173.07
PCP outpatient#	Crude	36.28	30.77	96.93
	Adjusted	36.28	27.22	94.12
Inpatient	Crude	97.92	84.86	75.34
	Adjusted	97.92	104.82	89.02
Inpatient (-2 GHC outliers)	Crude	97.92	67.63	75.34
	Adjusted	97.92	90.25	82.49
Total#	Crude	256.09	184.82	240.33
	Adjusted	256.09	214.70	262.08
Total (-2 GHC outliers)#	Crude	256.09	167.41	240.33
	Adjusted	256.09	201.18	256.03
Admission in 18 months (N=3182)	Crude	7.3%	6.2%	8.3%
	Adjusted	7.3	6.1	7.8
Ambulatory Visit in 18 months (N=3182)##	Crude	65.5	89.7	86.7
	Adjusted	65.5	87.7	86.3

*Crude rates as well as rates adjusted by multiple regression using control variables listed in Table VI-20 are presented.

**Rates are standardized to BC sample of enrollees with known responses to all control variables listed in Table VI-20.

#Overall plan effect highly significant ($p<.001$) for model predicting log-transformed annualized standardized volume, BC and GHC having signficantly lower transformed volume ($p<.001$ for both) than UHC.

##Overall plan effect highly significant ($p<.001$) for model predicting at least one ambulatory visit in the 18 month study period, BC having a significantly lower percentage with visits than UHC.

more intensive visits. UHC is a mix of the two plans, taking the most expensive element from each: most people have visits, similar to GHC, and the intensity of the visits is expensive, similar to BC. The standardized volume per user is somewhat lower for UHC than for BC, suggesting some effect of the PCPs providing less expensive care. However, this slight effect does not compensate for the higher percentage of UHC enrollees using services and total UHC outpatient standardized volume is similar to total BC outpatient standardized volume. (The interpretation of the log transformed data is in Volume II, Appendix VI.6.)

Correlates of Use

Correlates of use were studied in two ways, univariate and multivariate. For the univariate analysis, we examined the partial correlation of independent variables with standardized volume, controlling for plan, age and sex and their interaction terms. In addition, we ran a stepwise regression on two random halves of the data to determine a "best" general model for predicting standardized volume across plans.

Simple and partial correlations with outpatient standardized volume are shown in Volume II, Appendix VI.11, Table VI-A24. Race, marital status, family composition, family size, relationship to subscriber, employment status and all of the health status variables are significantly related to outpatient standardized volume. Non-whites, unmarried adults or children of single parents, enrollees in families with only a subscriber and spouse, enrollees in large families, dependents, families where both spouses worked full time and healthier enrollees had lower use than those in contrasting categories. Enrollees in families with high income, not employed in heavy labor and with other insurance coverage have less use, as do enrollees who are somewhat dissatisfied with their plans.

Variables which were represented by more than one dummy variable were tested using analysis of variance. Family composition, relationship to subscriber, employment status, occupation and satisfaction were found to be significantly related to the untransformed measures of outpatient use.

The correlates of independent variables with inpatient use are shown in Volume II, Appendix VI.11, Table VI-A25. Because the measure of inpatient use is highly variable (equals zero for most enrollees but can have very high values for those who had such use) it is difficult to achieve statistical significance.

Age and sex are significantly related to inpatient use, with older enrollees and females having more use. After controlling for age, sex, their interaction terms and exposure, very few significant relationships were found in the transformed data.

The health status variables were all significantly related to inpatient use in the expected direction. Enrollees with more education had more inpatient use, as did heavy laborers. Also, those with more use of services before July 1978 were more likely to use inpatient services after July 1978. Family composition, relationship to subscriber and employment status were not significantly related to inpatient use.

Multivariate Model to Predict Use

We randomly selected half of the sample to determine a single model using stepwise regression to predict outpatient use. The model was then tested on the other half of the sample. We did not model inpatient use because of its low correlation with the other variables. The regression process is explained in detail in Volume II, Appendix VI-12. A summary is presented in Table VI-22.

This table shows that for both subsamples the following procedures were followed: (1) exposure, age, sex and their interaction terms were forced into the regression; and (2) previous use, health status, other insurance and race, in that order, were entered. The effect of age and sex is detailed in a following section on interactions. The effects of the other variables were in the expected direction; enrollees who had previous high outpatient use, poor health status, no other insurance and who were white had higher use of services than others. The coefficients can be seen to be reasonably similar in the two subsamples.

Multivariate Predictors of Use for Each Plan

We next developed stepwise regressions of outpatient standardized volume for each plan. To guard against spurious results, the enrollees in each plan were randomly divided into two subsamples, and the regressions were performed separately on each half of the data. The final regression equations, calculated for the subsamples, are shown in Tables VI-23 through VI-25. (The methods used in obtaining these tables are discussed in more detail in Volume II, Appendix VI.13.)

There is generally quite strong agreement in the data between the subsamples for each plan. Across plans, generally the same variables entered with the same sign (exceptions are noted below). As expected, previous use, poor health status, no other insurance and white race are all associated with higher standardized volume. Race did not enter the BC equation, other insurance did not enter the GHC equation and neither race nor other insurance entered the UHC equation.

TABLE VI-22
REGRESSION COEFFICIENTS PREDICTING LOG-TRANSFORMED ANNUALIZED OUTPATIENT STANDARDIZED VOLUME FOR ALL PLANS

Independent Variable	Unstandardized Coefficients	
	Sample 1	Sample 2
Exposure Months	-.048	-.025
Age	-.044*	-.038*
Sex	-.684*	-.341
Age^2	.001*	.001*
Age x Sex	.065*	.031*
Age^2 x Sex	-.001*	.000
Previous Outpatient Standardized Vol.	.002*	.002*
Health Status Index	.045*	.050*
Number of Other Insurance Plans	-.477*	-.269*
Race (0=White, 1=Non-white)	-.205	-.324*
	R^2=.220	R^2=.194

*Coefficient statistically significant ($p \leq .05$).

TABLE VI-23
REGRESSION COEFFICIENTS PREDICTING LOG-TRANSFORMED ANNUALIZED OUTPATIENT STANDARDIZED VOLUME FOR BC ONLY

Independent Variable	Unstandardized Coefficients	
	Sample 1	Sample 2
Exposure Months	-.043	.017
Age	-.074*	-.034
Sex	-1.090*	-.434
Age^2	.001*	.001*
Age x Sex	.095*	.033
Age^2 x Sex	-.001*	-.000
Previous Outpatient Standardized Vol.	.003*	.002*
Number of Other Insurance Plans	-.677*	-.396*
Health Status Index	.043*	.045*
	R^2=.286	R^2=.239

*Coefficient statistically significant ($p \leq .05$)

TABLE VI-24
REGRESSION COEFFICIENTS PREDICTING LOG-TRANSFORMED ANNUALIZED OUTPATIENT STANDARDIZED VOLUME FOR GHC ONLY

Independent Variable	Unstandardized Coefficients	
	Sample 1	Sample 2
Exposure Months	-.079	-.111*
Age	-.035*	-.062*
Sex	-.333	-.315
Age^2	.000	.001*
Age x Sex	.040	.038*
Age^2 x Sex	-.000	-.001
Health Status Index	.046*	.024*
Previous Outpatient Standardized Vol.	.001*	.002*
Race (0=White, 1=Non-white)	-.224*	-.501*
	R^2=.180	R^2=.220

*Coefficient statistically significant ($p \leq .05$)

TABLE VI-25
REGRESSION COEFFICIENTS PREDICTING LOG-TRANSFORMED ANNUALIZED OUTPATIENT STANDARDIZED VOLUME FOR UHC ONLY

Independent Variable	Unstandardized Coefficients	
	Sample 1	Sample 2
Exposure Months	.008	.064
Age	-.020	-.013
Sex	-.515	-.298
Age^2	.000	.000
Age x Sex	.054	.027*
Age^2 x Sex	-.001	-.000
Health Status Index	.044*	.055*
Previous Outpatient Standardized Volume	.002*	.001*
	$R^2=.163$	$R^2=.197$

*Coefficient statistically significant ($p \leq .05$)

However, this is based on stepwise selection of variables, and does not indicate that variables which did not enter were not significant predictors in the plans; it simply means that after controlling for other variables , they were no longer significant.

Interactions between Independent Variables and Plan

In the previous section we saw that different variables seemed to be important as predictors of use in the three plans. To study this further we examined interactions between the plan variable and the other independent variables. This was done in two ways. First, we studied all of the variables of Table VI-20 within plan to see which were significantly related to standardized volume. Second, we tested for interactions of the variables noted above to be important predictors, using a structured regression model which is more fully explained in Volume II, Appendix VI.13.

Correlations between independent variables and log transformed annualized outpatient standardized volume and log transformed annualized inpatient standardized volume were performed controlling for exposure, age, sex and their interaction terms. Independent variables were selected based on conceptual importance.

The results of these correlation analyses are shown in Volume II, Appendix VI.13, Table VI-A29 and Table VI-A30. For this discussion we concentrate only on the variables which entered one of the four multivariate regressions reported above. This is done to reduce the number of interactions which must be considered, and because, after controlling for these variables, the other variables with potential interaction were no longer significant predictors of standardized volume.

We first constructed a single regression model to test each of these interactions for statistical significance, controlling for other interactions. This work is summarized in Table VI-26 explained in greater detail in Volume II, Appendix VI.13. The regressions were also run for the untransformed data; the results are shown in Volume II, Appendix VI.13, Table VI-A37. The results are very similar except for the effect of other insurance, which is discussed below.

As shown in the table, we controlled for the variables in the following order: (1) age, sex and their interaction terms, exposure and plan; (2) interactions between plan and each of the age and sex indicators, some of which were statistically significant; (3) health status; and (4) interaction between health status and each plan, GHC and BC. After this, we controlled for all the variables mentioned in the above steps and did four separate regressions entering, respectively,

TABLE VI-26
STRUCTURED REGRESSION TO TEST FOR PLAN INTERACTIONS (DEPENDENT VARIABLE = LOG-TRANSFORMED* ANNUALIZED OUTPATIENT STANDARDIZED VOLUME)

Step**	Variables Entered	R^2	Significance of Step
1	Months of Exposure, Age, Sex Age^2, Age x Sex, Age^2 x Sex, and BC, GHC plan dummy variables	.0746	.000
2	BC x Age#, BC x Sex, BC x Age^{2}#, BC x Age x Sex, BC x Age^2 x Sex, GHC x Age#, GHC x Sex, GHC x Age^{2}#, GHC x Age x Sex#, GHC x Age^2 x Sex#	.0815	$.05 < p < .10$
3	Health status index#	.1507	.000
4	BC x Health status index, GHC x Health status index#	.1527	$.05 < p < .10$
5	Previous outpatient std. volume#	.2059	.001
6	BC x previous outpatient std. volume# GHC x previous outpatient std. volume#	.2097	.001
5'	Race#	.1632	.001
6'	BC x Race, GHC x Race	.1637	$p > .50$
5"	Number of other ins. plans#	.1813	.000
6"	BC x Number of other ins. plans# GHC x Number of other ins. plans#	.1851	.005
5"'	Family size#	.1557	.001
6"'	BC x family size, GHC x family size#	.1569	$p < .05$

*Natural logarithm of standardized volume +10.

**Steps 5 and 6 are repeated for each of the variables of interest (5, 6 for previous outpatient standardized volume; 5', 6' for race, 5", 6" for the number of other insurance plans; 5"', 6"', for family size).

#Variable significantly related to log-transformed annualized outpatient standardized volume at end of previous step.

previous outpatient use, race, other insurance and family size on the fifth step, and then entered their interactions with plan on the sixth step. In Volume II, Appendix VI.13, Table VI-A37 steps 5 and 6 for each of the variables of interest, are labelled 5,5',5'', etc.

The results of this regression are discussed in the following section(s). In addition, Table VI-27 shows the "zero-order" relationships between the plan variable and the independent variables of interest. This table will also be discussed in the following section.

Interaction Effects of Plan, Age and Sex on Outpatient Annualized Standardized Volume

Age and sex were studied first. The model permits a separate quadratic relationship between age and outpatient standardized volume for each of the six sex by plan groupings, and also permits a test for the significance of difference among the plans in these curves. We show curves rather than equations for ease of interpreting the results. Only age, sex and plan variables were controlled in these equations.

The graphs of these six curves are shown in Figure VI-4 for annualized outpatient standardized volume. Plots for visits are shown in Volume II, Appendix VI.13, Figure VI-A3. The differences between curves for males and females are not the same for all plans, and the difference between two people of different ages is not constant across the plans. Thus, age by plan and sex by plan interactions exist.

The curves for UHC and BC male enrollees are quite similar. The curves for UHC and BC female enrollees are similar for older women, but standardized volume is much lower in BC than UHC for younger women. The curves for GHC men and GHC women are similar to one another, and lower than the BC and UHC curves for both sexes. The fit of these curves to the data is supported by the averages shown in Table VI-27.

The statistical significance of the interactions was tested. Eight of the possible ten interaction terms were statistically significant after controlling for main effects. Annualized outpatient visits were also considered, and are shown in Volume II, Appendix VI.13.

Interaction Effects of Plan and Other Variables on Outpatient Annualized Standardized Volume

Since these interactions are difficult to understand, we ran a regression with only age, sex and their interactions, the main effects for plan, the variable of interest and interactions between plan and that variable. From this relatively simple equation it was possible to develop a simplified equation to predict annual outpatient standardized

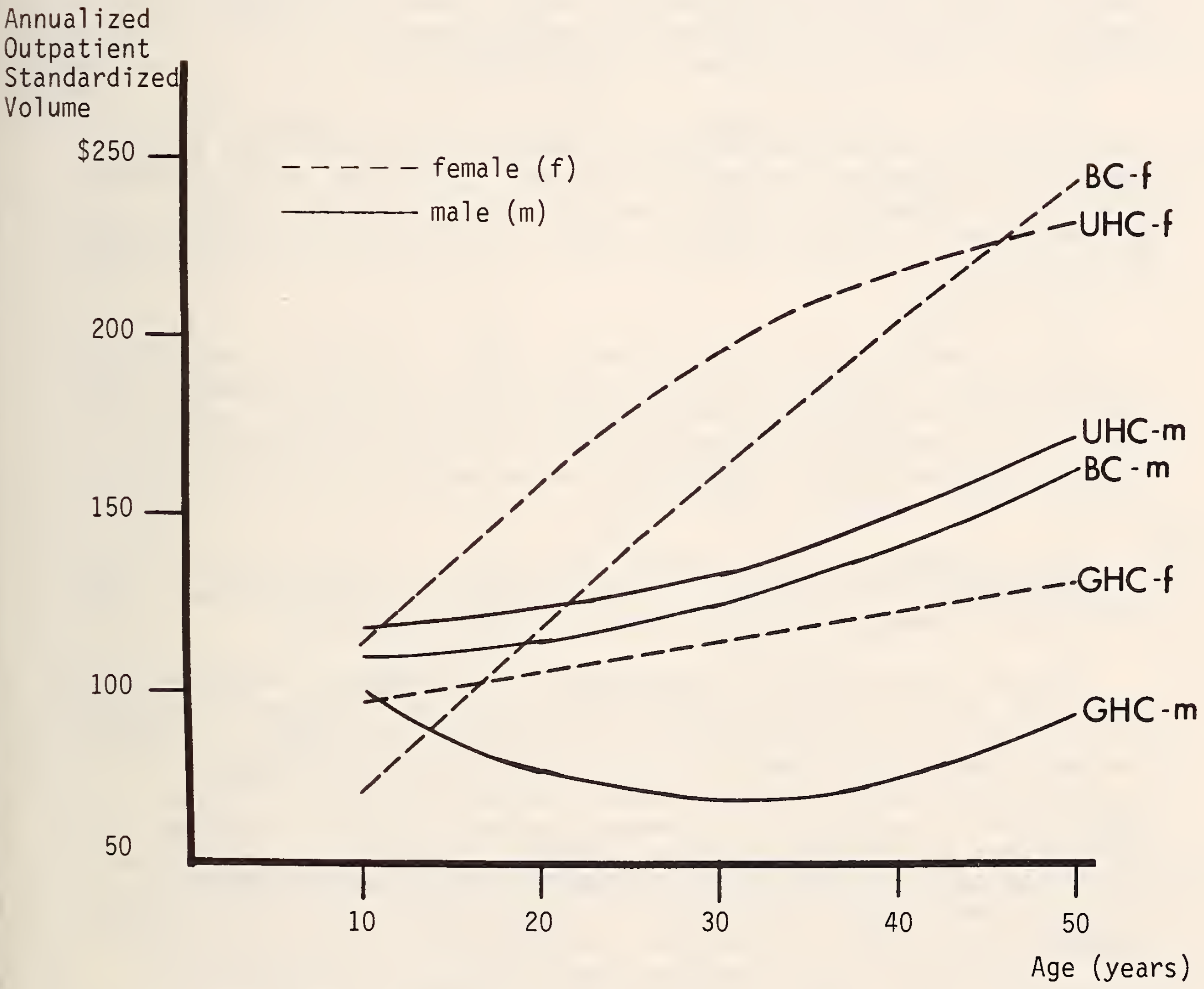
TABLE VI-27
ANNUALIZED OUTPATIENT STANDARDIZED VOLUME BY PLAN AND INTERACTING VARIABLES

Variable		Annualized Outpatient Std. Volume		
		BC	GHC	UHC
Age-Male (yrs)	0-5	$169	$175	$224
	6-18	97	74	81
	19-44	139	71	159
	45+	164	107	171
Age-Female (yrs)	0-5	98	115	144
	6-18	74	73	92
	19-44	190	119	214
	45+	241	127	222
Race	White	167	106	169
	Non-white	102	79	139
Health Status* Index	0-4	83	67	97
	4-7	143	92	137
	7-12	165	108	161
	12-52	416	246	375
Previous Outpatient Std. Volume ($)	0-50	96	78	128
	50-100	196	118	211
	100-200	218	130	219
	200+	301	168	323
Number of Other Insurance Plans	0	174	104	177
	1	144	88	143
	2	70	31	116
	3	-	-	169 (n=3)
Family Size	1	234	102	225
	2	163	104	186
	3	180	101	167
	4	136	103	151
	5	85	86	119
	6+	125	94	89

*Larger values represent worse health. (See Volume II, Appendix VI.2 for details of index structure.)

FIGURE VI-4

PLAN, AGE AND SEX INTERACTIONS
FOR OUTPATIENT STANDARDIZED VOLUME



volume as a function of the variable of interest, for an "average" person. The fact that only one interaction is considered at a time may be distorting these relationships somewhat. The simplified equations are shown in Volume II, Appendix VI.13, Table VI-A28 and graphed in Figures VI-5 through VI-8. These figures are based on untransformed data, and thus may give somewhat different results from those shown in Table VI-26 which were based on log standardized volume. Loosely interpreted, the untransformed data results refer to the arithmetic mean differences, while the log transformed results refer to differences in the medians. This is discussed further in Volume II, Appendix VI.6.

When the relationship of health status to outpatient standardized volume is examined, both BC and UHC have nearly identical responses to health status, which are more extreme with steeper upward slopes than the GHC response. This interaction is illustrated in Table VI-27, and the difference between GHC and UHC is shown to be statistically significant in Table VI-26.

When family size is considered with respect to outpatient standardized volume, again UHC and BC look very similar, both having lower volume for people in larger families. GHC has very little response to family size. This relationship is shown in Table VI-27. The difference between GHC and UHC is statistically significant.

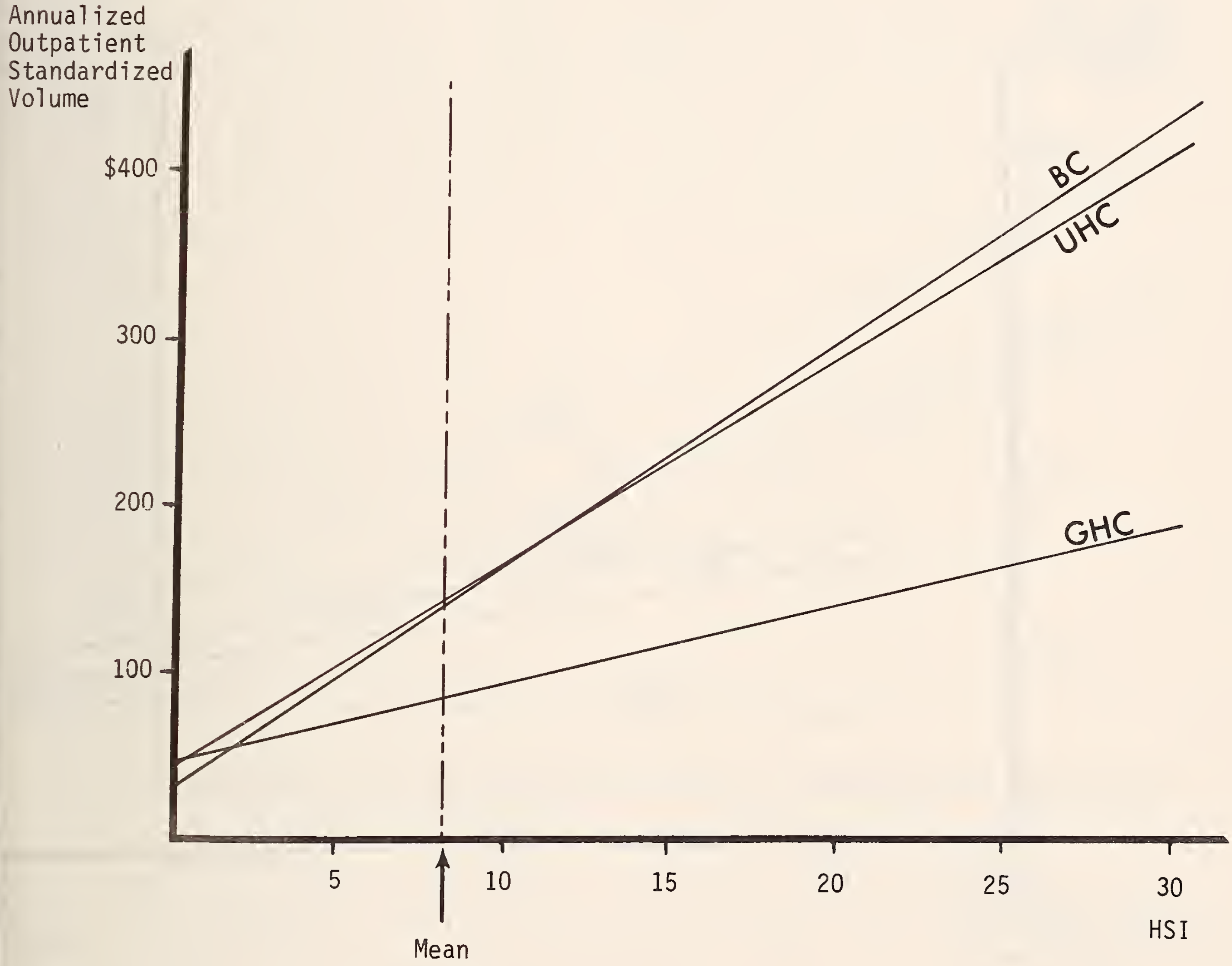
The effect of prior outpatient use of services on standardized volume is very similar for all three plans. The GHC and BC lines are significantly lower than UHC.

Table VI-26 shows a significant interaction between other insurance and standardized volume. Looking at Figure VI-8, or Table VI-27, this interaction is difficult to see. In Volume II, Appendix VI.13, Table VI-A37, the results for the untransformed standardized volume do not indicate a significant interaction between these variables. Because of differences in interpretation already between the transformed and untransformed data (see Volume II, Appendix VI.6), this probably means that the effect of other insurance on the mean standardized volume is similar across the three plans, but that the effect on the medians was different across plans. Presumably, this means that the percent using services differed by the number of other insurance policies held. This effect is estimated at $26 for each additional insurance policy in GHC, $34 for UHC and $44 for BC indicating that people who have an additional policy may not use their BC coverage unless their use was high enough to meet the deductible.

The effect of race is similar in all three plans, with whites having more use than non-whites. Although previous analysis suggested that there was a stronger effect in GHC

FIGURE VI-5

PLAN AND HEALTH STATUS INDEX (HSI)* INTERACTIONS FOR ANNUALIZED OUTPATIENT STANDARDIZED VOLUME



*Larger values represent worse health; see Appendix VI.4 for details of index structure.

FIGURE VI-6

PLAN AND FAMILY SIZE (FAMSIZ) INTERACTIONS
FOR ANNUALIZED OUTPATIENT STANDARDIZED VOLUME

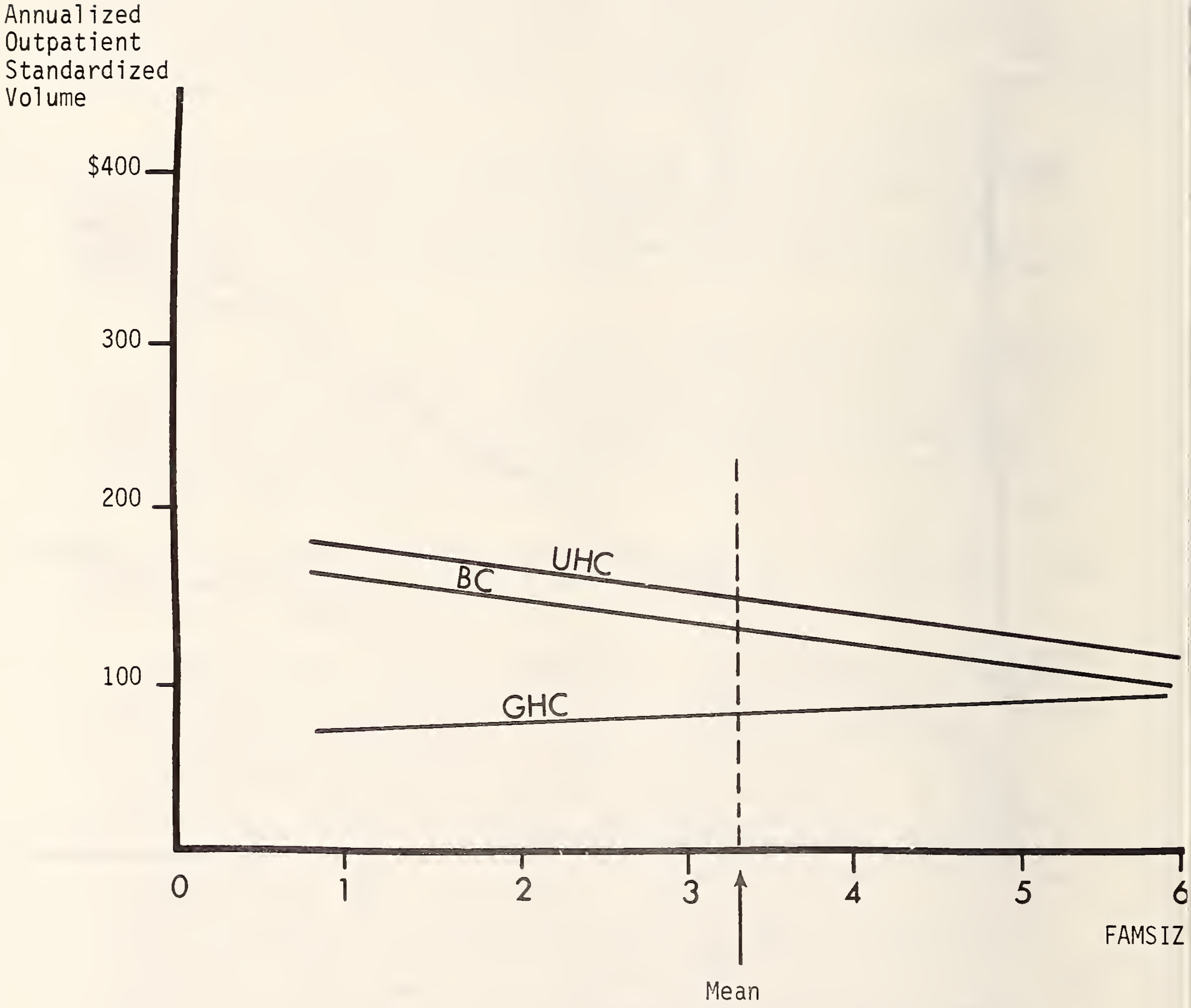


FIGURE VI-7

PLAN AND PRIOR OUTPATIENT USE (PRE JULY 1978) INTERACTIONS FOR ANNUALIZED OUTPATIENT STANDARDIZED VOLUME

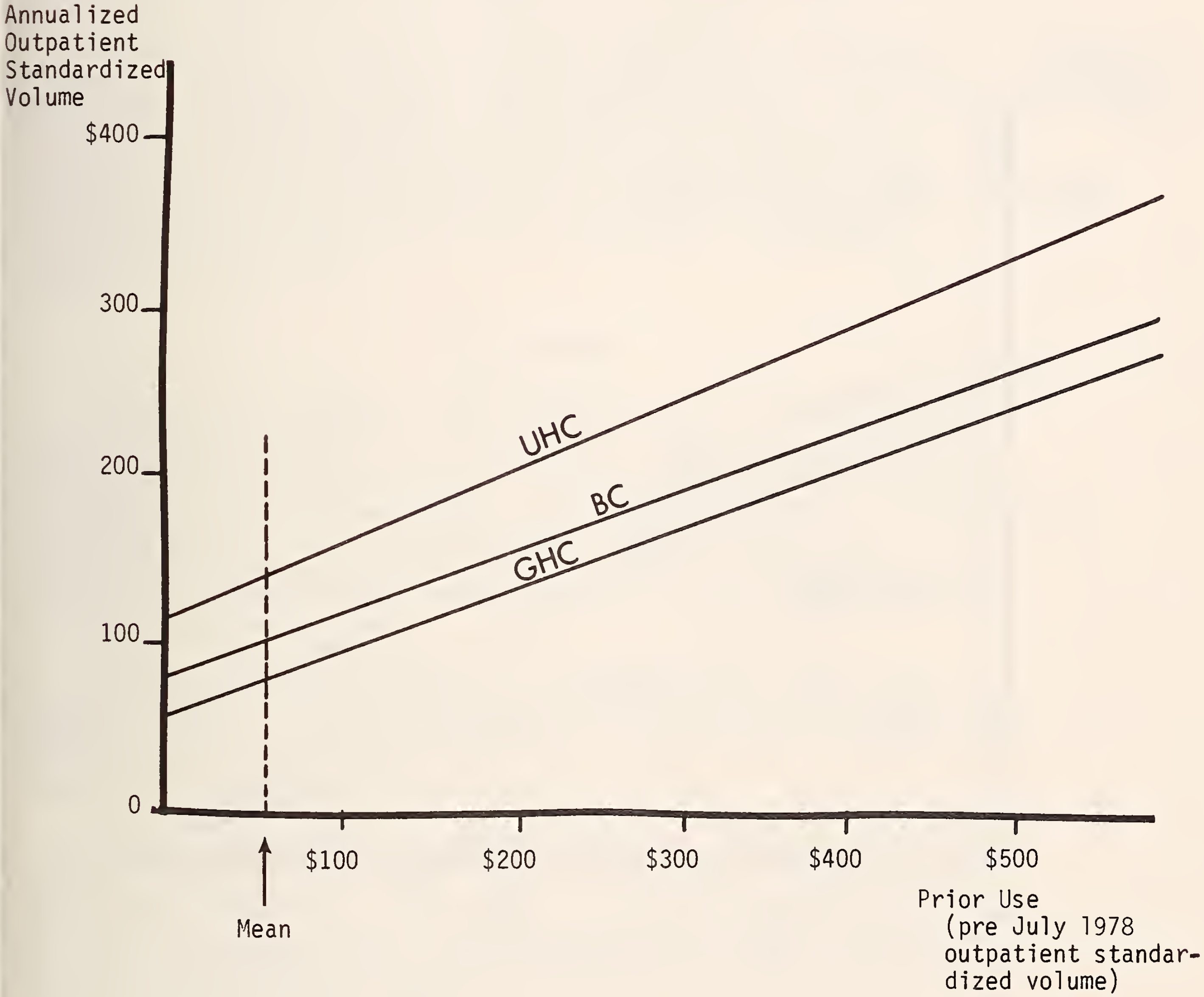
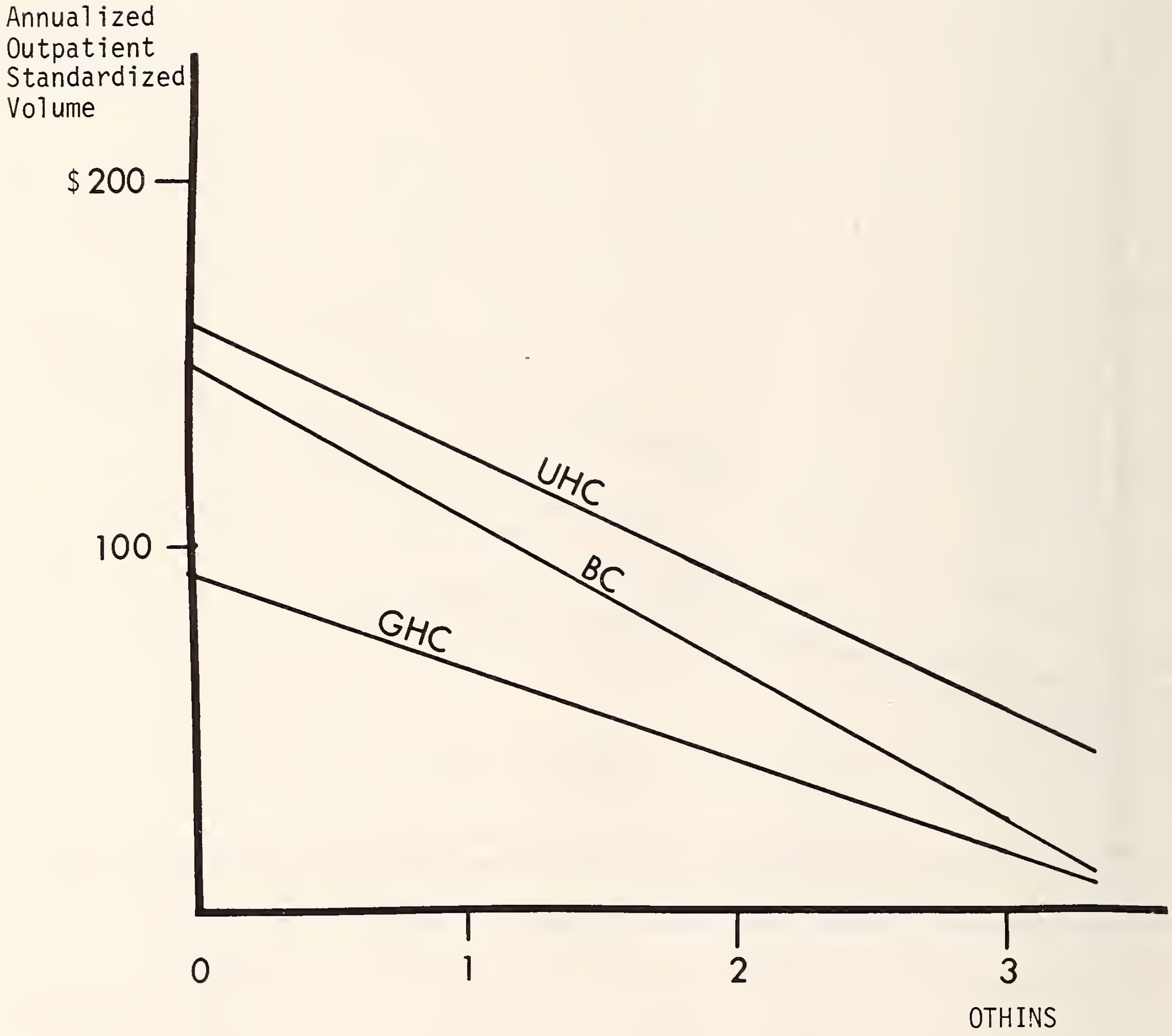


FIGURE VI-8

PLAN AND NUMBER OF OTHER
INSURANCE PLANS (OTHINS) INTERACTIONS
FOR ANNUALIZED OUTPATIENT STANDARDIZED VOLUME



than in the other plans, the regression analysis of Table VI-26 shows no significant interaction between race and plan. Table VI-27 does not clarify the effect because it illustrates a larger effect for BC than for the other plans. Thus, the apparent race interaction disappeared after controlling for other plan interactions, particularly those with age, sex and health status. Volume II, Appendix VI.13, Table VI-A37, showing untransformed use, also shows no race effect.

Additional analyses of interactions between patient characteristics and plans on use of ambulatory services are presented in Diehr P, Martin DP, Price KF et al., "Use of Ambulatory Care Services in Three Provider Plans: Interactions between Patient Characteristics and Plans." This analysis separated USE (yes/no) from standardized volume (for users only). Use in GHC was least affected by enrollees' characteristics and use was most sensitive to patient characteristics in BC.

DISCUSSION

There are a number of artifacts of the study which may affect interpretation of its results. First, the size of the study population may be too small for us to detect important differences among the plans. This is likely to be true for estimates of rare events such as hospitalizations. We discuss the precision of our estimates and provide confidence intervals for major variables of interest at the end of each section of the results. Confidence intervals are provided in Volume II, Appendix VI.4.

Second, the duration of the study may not have been adequate for stable estimates, especially for hospitalization rates. Rates of rare events may be particularly unstable for estimates of use prior to the 1978 open enrollment because they were based on only six months of data.

Third, enrollees who switched to the UHC plan may have required six to twelve months to learn this system. This may affect the results of the study when comparing UHC switchers with individuals who stayed with BC and GHC, plans that they already knew how to use. We attempted to lessen the effect of the learning period by studying only individuals with at least twelve months in the plans.

Fourth, as was mentioned in a previous section, we cannot separate the effects of the different facets of the plans. For example, the effect of the organizational structure cannot be distinguished from that of PCP use or enrollees' cost sharing.

Fifth, we could approximate but not ensure comparability of data across the plans. Data processing was carried out in the same manner for all plans. The reliability of the data was assessed during the pretest period and item and interviewer reliability were high with no difference among plans. Validity of the data was not assessed and although there are probably few problems with validity for family and person characteristics obtained from the initial household interview, there may be validity problems regarding in-plan use across the plans due to differences in abstracting from claims and medical records. We did not reconcile plan record data with interview data for BC nor did we validate the plan records and interview information against physician records due to the high cost of obtaining this information. We attempted to define variables comparably across plans. For those variables which could not be defined identically across plans we tested various definitions and always chose that definition which would lead to a conservative interpretation. We note these variables, e.g. PCP, brief visit, in the results section and encourage readers to interpret these results cautiously.

We have examined differences in demographic factors between the three sets of enrollees and, although there were differences, they were generally favorable to UHC. Once these differences were controlled, the results remained the same:

> No difference in inpatient use could be detected between the plans (although our sample size was too small to make sure that there were no sizeable differences).
>
> For outpatient use, both GHC and UHC had a higher percentage of enrollees who used services (nearly 90 percent) compared to BC (70 percent).
>
> The outpatient services provided to users were most intensive in BC ($224 per year) followed by UHC ($188) and lowest for GHC ($112).
>
> The mean charges, the product of the proportion using services and the amount per user, was similar in UHC and BC ($165 and $157, respectively).
>
> UHC thus combined the most expensive features of GHC (high number of patients having use) with the most expensive feature of BC (intensive use for those with services) which resulted in the highest costs of the three plans even though it had the "most favorable" patient mix.

Since the distribution of use for the three plans were so different, we tried to see what characteristics of the enrollees were associated with those differences. GHC was least responsive to the age and sex of the enrollees, while BC was most responsive. This resulted in all GHC enrollees having low costs, BC enrollees with few health needs (young males, females not in the child-bearing ages) having low use and UHC having relatively high use for all age and sex categories.

Enrollees in poor health had higher standardized volumes of services at UHC and BC than at GHC. GHC enrollees had and used fewer other types of insurance, which was significantly different from BC and UHC. GHC was less sensitive to family size as indicated by similar volumes of services to people in families of all sizes, in contrast to the other two plans.

This general pattern across BC and GHC was seen in the Seattle Prepaid Health Care Project, which studied GHC and King County Medical/Blue Cross, a plan similar to BC here. In that study it was noted that GHC was less sensitive to patient characteristics, providing a fairly similar number of visits for all enrollees, while in King County Medical/Blue Cross the young healthy enrollees had very little or no use and those with greater health needs had a good deal of use. In the SEIBUS project, we see that UHC is a mixture of the two patterns, with the probability of a visit being relatively independent of need, but the services received by users being quite expensive relative to GHC.

It seems reasonable that UHC and BC would have similar standardized volume for users, since the same physicians were seeing patients under both insurance plans. The UHC standardized volume per user was somewhat lower than the BC volume, possibly reflecting the higher use of PCPs in UHC or the fact that the users were less in need of care in UHC.

The higher percentage of UHC enrollees using services is not as easy to assess. It can be considered partly a plan effect because in UHC, as in GHC, choice of a plan essentially determined choice of a provider. This facilitating factor may well have encouraged people to make use of services.

On the other hand, since the decision to make the first visit is primarily the province of the patient, there may also have been adverse selection into UHC which was not reflected in the control variables we used. The switchers from BC, at least, might have been those who were having low use in BC because of the high out-of-pocket costs rather than because they did not feel a need for these services. This is certainly supported by Table VI-18 which shows that the switchers from both plans had relatively low use pre-switch followed by higher use after the switch.

If a UHC-like plan were to be tried again, how could this experience be used to improve the outcome? Either the percentage using services must be decreased, the cost per service decreased or the premium for the insurance plan increased.

CHAPTER VII

RANDOMIZED EXPERIMENT OF PHYSICIAN CONTROL OVER THE USE OF SERVICES*

INTRODUCTION

As health care costs have continued to rise, cost control mechanisms have come under close scrutiny. Because physicians direct most medical expenditures either by ordering procedures or by referring to specialists or hospitals, new plans are attempting to control costs by providing private practice physicians with financial incentives to control costs. Several types of independent practice associations (IPAs) have developed which offer various payment and incentive arrangements (Breu and Hershberger, 1979; Evans, 1980). Although there is some case study evidence that IPAs decrease the use of services if physicians share financial risk of health care costs (Phillips and Dorsey, 1980), no carefully designed research has explored IPA physician incentives and the control of hospital or ambulatory care. We conducted a controlled randomized experiment to determine the effect of the primary care physician/United Healthcare system on the use and cost of care. United Healthcare (UHC) attempted to contain costs by requiring primary care physicians (PCPs) to share in the financial risk of caring for their patients. Primary care physicians in private practice were encouraged to become financial as well as medical managers of their patients' care. PCPs were given an incentive to control costs: if a PCP effectively controlled his or her UHC patient panel's use of services, the physician shared in a surplus at the end of the year; if the PCP was less effective in controlling use of services, he or she was required to pay UHC a portion of the deficit.

State employees who first chose UHC during the 1979 open enrollment were randomly assigned to a control or an experimental group. Individuals in the control group received the standard UHC plan. Those in the experimental group received the same coverage but were not required to choose a PCP or to have care approved by such a physician. Thus, the experimental variable is conceptualized as the extent of control over health care use by the PCP/UHC system. Due to the design of the UHC plan, we cannot separate PCP control from the UHC system. A PCP can only control use of services after the patient has entered the health system for care. But the UHC system may have increased visits by requiring the choice of a PCP and encouraging an orientation visit; alternatively it may have decreased visits by requiring the PCP to monitor all care. We made no attempt in the experimental design to separate PCP control from UHC system control because both are key elements of the standard UHC plan. We were interested in the interaction of the enrollees' demand for care and the physicians' use of services.

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The major objective of this study was to compare the use and cost of services for persons in the control group with that for persons in the experimental group. We expected use and cost of services to be lower for the control group than the experimental group, but the magnitude of the difference was uncertain.

Figure VII-1 shows the model for the randomized experiment of physician's control of services. The dependent variables in this study are cost, volume and type of health services. Billed charges are used as a proxy variable for cost. Measures of the volume of services include number of ambulatory care visits and number of hospitalizations. Charges and use of services are examined for PCPs and non-PCPs, outpatient and inpatient care, and type of procedure.

Two types of control variables were included. Blocking variables (type of employer and previous health care plan) were used to randomly assign subscribers and their family members to the experimental and control groups. Secondly, other control or extraneous variables included sociodemographic characteristics, social structural variables, perceived health status, usual source of care prior to switching to UHC, other health insurance coverage and reasons for choice of UHC and PCP. We were also interested in the families' experiences in using the plan to which they were assigned and their months of exposure to the plan.

METHODS

Design

The basic study design was a controlled randomized experiment. Subscribers who volunteered to participate in the study were randomized by previous state health care plan (Blue Cross (BC), Group Health Cooperative (GHC), or no state plan (for new employees) and employer (higher education or other state agency) into the control or experimental group according to a blocked, balanced randomization scheme.* Previous health care plan and type of employer were used as blocking variables because state health insurance plan information showed that use of services was significantly different for these groups.

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*The randomization design was balanced every 20 subscribers. A balanced scheme results in the highest precision of the estimate of the differences between two groups.

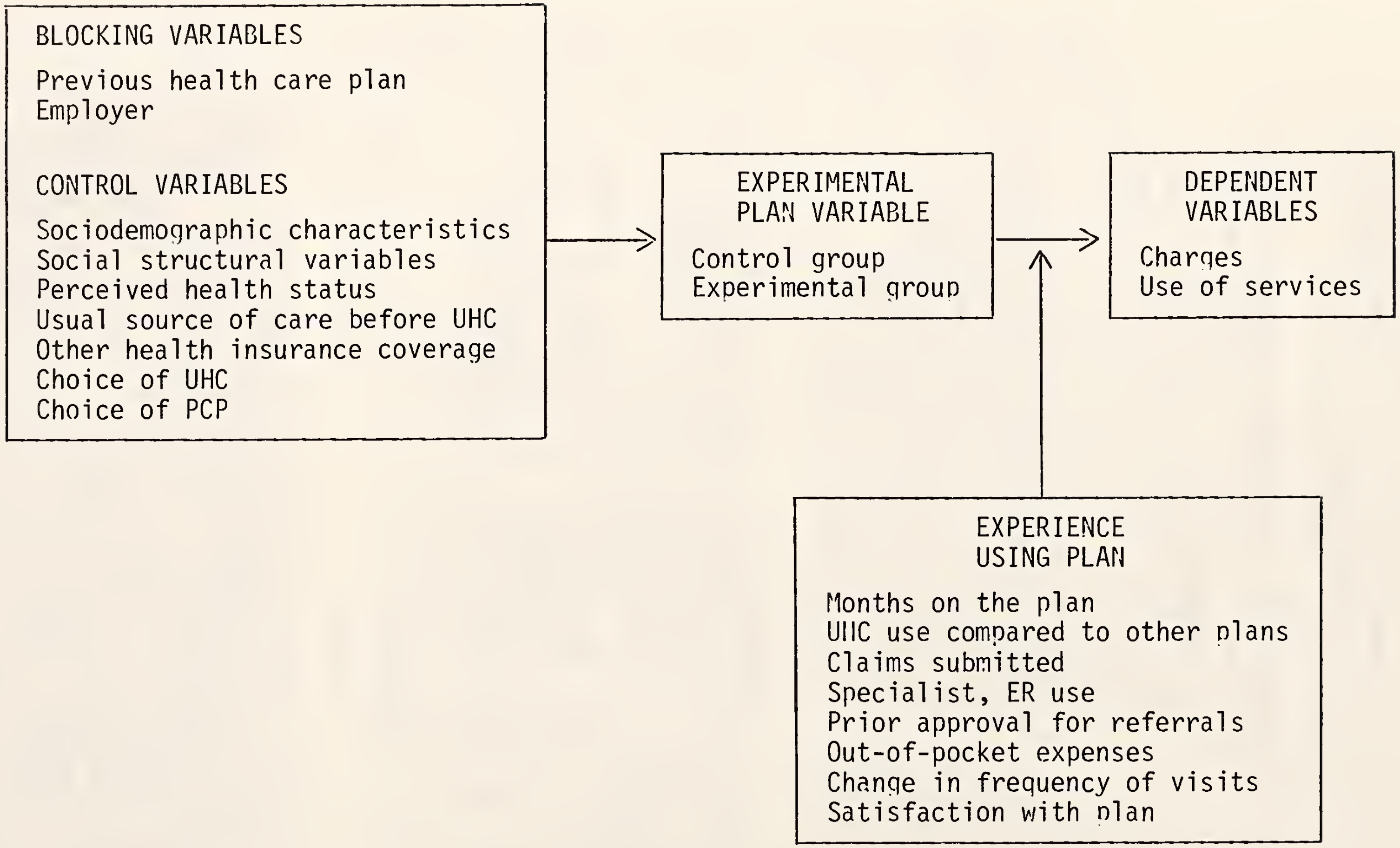

FIGURE VII-1
MODEL FOR RANDOMIZED TRIAL
OF PHYSICIAN CONTROL OF SERVICES

Description of Coverage in Each Group

We attempted to design the two groups to insure as much as possible that all enrollees had equal coverage and similar administrative procedures. Individuals in the control group received the standard UHC plan and benefit package, including a $25 copayment for general physical examinations and a $2 copayment for each prescription. (Benefits of this plan are more fully presented in Volume II, Appendix II.1) Individuals in the experimental group received the same standard benefit package, but they were not required to choose a PCP or to obtain the approval of a PCP for emergency visits, specialist care or hospitalizations.* Whereas all claims submission for the control group was handled by the physician's offices, the experimental group was required to submit claims directly to UHC for payment; enrollees were provided with stamped envelopes addressed to UHC to facilitate claims submission. Providers were reimbursed directly by UHC for both groups.

Population

Because fewer state employees opted for UHC in the 1979 open enrollment period than had been expected, all new subscribers who met the following criteria were eligible for the study:

1. State employee on June 15, 1979 or hired on or within three months following that date.
2. UHC enrollee beginning July 1, 1979 to October 1, 1979.
3. Resident of the greater Seattle area.

Retirees were excluded from the population. Using these criteria, 1,239 eligible state employees were identified of which 91 percent agreed to participate in the study.** Subscriber response rate is presented in detail Volume II, Appendix VII.1.

Enrollees in the population who agreed to participate were randomized into the control (N=555) or experimental group (N=558). Table VII-1 shows the results of the random assignment of the 1,113 families (2,827 individuals).

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*However, 86 percent of the people in the experimental group chose a PCP at the time they enlisted in the UHC plan. After entry into the study enrollees were notified that they did not have to use that PCP or have care approved by him or her. UHC PCPs were also notified that these individuals were not covered by the standard UHC plan.

**The population includes some subscribers (N=32) who participated in the choice of plan and comparative utilization components of the study during 1978 but switched from BC or GHC to UHC during the 1979 open enrollment

TABLE VII-1
SUBSCRIBER DISTRIBUTION FOR PHYSICIAN CONTROL EXPERIMENT BY GROUP STATUS, PREVIOUS HEALTH PLAN COVERAGE AND EMPLOYER

	Previous Health Plan								
	Experimental Group				Control Group				Experimental & Control Total
	BC	GHC	Other*	Total	BC	GHC	Other*	Total	
Employer	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Total Washington State employees	254 (22.5)	113 (10.1)	191 (17.4)	558 (50.1)	250 (22.2)	114 (10.2)	191 (17.3)	555 (49.9)	1113 (100.0)
Higher education	183 (16.3)	65 (5.4)	146 (13.2)	394 (35.1)	180 (15.8)	62 (5.6)	148 (13.4)	390 (34.9)	784 (69.9)
Other state agency	71 (6.1)	48 (4.5)	45 (4.2)	164 (15.1)	70 (6.4)	52 (4.7)	43 (3.9)	165 (15.0)	329 (30.0)

*The other category is made up of new state employees who had no previous experience with state health plans.

Data Collection

Initial Telephone Interview

At the beginning of the study, interviewers contacted each subscriber, explained the details of the study and asked the subscriber to complete a telephone interview which took approximately 15 minutes. The interview schedule consisted of questions about the subscriber and about individual family members (Volume III, Appendix VII.1). Topics included: employment, health insurance coverage, reasons for choosing UHC, previous source of health care and reasons for choosing a specific PCP. Many questions were taken from the Comparative Utilization/Choice of Plan household interview and other health care survey instruments.* This interview provided us with information used in random assignment to groups as well as information regarding control variables to be used in the analysis.

Because the entire population was included in the study, we could not draw a separate sample for pretesting the interview. As a result, the first 60 interviews were used as the pretest sample. The pretest demonstrated the adequacy of the instrument; the very few changes that were made did not threaten the consistency of information obtained in the 60 pretests and the subsequent interviews.

End-of-Study Mail Questionnaire

A short mail survey was conducted at the end of the experimental period in June 1980 to obtain additional information on subscribers and their family members participating in the experiment and to assess the families' use of the plan during the previous year. Two versions of the mail questionnaire were developed, one for the control group and one for the experimental group (Volume III, Appendix VII.2). Generally, questionnaires differed only in references to the health plan and its organizational characteristics. Questions referred to the family's use of the UHC plan, submission of claims, use of specialist and emergency services, extent to which PCP influenced the use of services, family out-of-pocket costs, impact of the plan on family use of services, satisfaction with the plan and coverage by other insurance plans. Subscribers in the control group were also asked whether the plan had refused payment for any health care visits which did not receive prior approval from the designated PCP. The response rate for the mail questionnaire was 95 percent and did not differ for the control and experimental groups.

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* Questions were obtained or modified from the National Medical Care Expenditure Study, the RAND Corporation's Health Insurance Study, Federal Employees Health Benefits Program Utilization Study and Seattle Prepaid Health Care Project.

Health Plan Records

Data on the dependent variables, use of health services and billed charges, were obtained from the UHC claims files (Volume III, Appendix VII.3). Use of archival data rather than self-report data eliminated the possibility of an experimental effect on enrollee behavior. Data on use and charges were collected for the experimental period July 1, 1979 to June 30, 1980. During August 1980 we abstracted from UHC membership files information on months of exposure to the plan and whether the subscriber had chosen UHC again during the 1980 open enrollment (Volume III, Appendix VII.4).

Field trial procedures are described in Volume II, Appendix VII.2.

Variable Definitions

Other variable definitions are self-explanatory or are described in the results section. Detailed variable definitions are given in Volume II, Appendix VII.3. Five variables, critical to the analysis, are described here.

The dependent variable, billed charges, includes all charges by providers excluding patients' copayments. Billed charges were used as a proxy measure for plan cost rather than the amount paid by UHC in order to insure a consistent measure in both the experimental and control groups. Billed charges differ from the amount paid by UHC in two ways. First, PCPs' were reimbursed at 95 percent of charges whereas specialty, ancillary services and hospital bills were reimbursed at 100 percent of charges. Second, coordination of benefits payments were not taken into account; but these were a small dollar amount.

Billed charges were summed over the study period for each enrollee. As expected, some enrollees had no charges whereas others had very high charges. For this reason, raw data are presented in the descriptive analyses while significance tests were performed on log-transformed data. Multivariate analyses were performed using both raw data and log- transformed data.

Because a claim does not necessarily represent a visit, it is difficult to count the number of visits from a claims-based file. Therefore, we used a procedure code visit definition. We used Current Procedural Terminology (CPT) or California Relative Value Scale (CRVS) procedure codes to define visits in the office, home, hospital, critical care unit, skilled nursing facility, nursing home and emergency room, as well as to identify consultant visits, well-baby visits, psychiatric visits, ophthalmology visits and physical medicine visits.

Hospital or inpatient care was differentiated from ambulatory or outpatient care by examining the claim location, level of care in the hospital, e.g. coronary care unit or or semi-private room, and length of stay in the hospital. Emergency room care was considered as outpatient care.

Procedures based on CPT or CRVS codes were recoded as five types. The following are examples of procedures in each category: (1) medical -- immunizations, dialysis, catherization and chemotherapy; (2) surgical -- appendectomy, mastectomy, endoscopy and biopsy; (3) radiologic -- computerized tomography, mammography and ultra sound; (4) laboratory -- urinalysis, chemistry and pap smear; and (5) visits -- all CRVS 90000's codes such as new patient visits and established patients visits of varying lengths. The number of missing procedure codes did not differ between the control and experimental groups.

PCP use/visit was identified using claim location and specialty of provider. For the control group a physician was designated as a PCP if (1) he or she was a UHC participating PCP or (2) he or she was a non-UHC general or family practitioner. For the experimental group a physician was designated as a PCP if he or she was not a UHC PCP and his or her specialty was general or family practitioner, pediatrician, internist, obstetrician/gynecologist, osteopath or a clinic-medical center.*

Data should be comparable for the control and experimental groups for the following variables: billed charges, visit, inpatient/outpatient care and procedure type. We are less confident of the comparability of the PCP variable because it does not indicate how patients used the PCPs in either group. A patient may have seen an internist or an obstetrician/ gynecologist as a PCP or as a specialist.

RESULTS

Homogeneity of Control and Experimental Groups

The adequacy of the random assignment was assessed by comparing the control and experimental groups on measured characteristics. We found that the groups were very similar regarding these characteristics.

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*Two different PCP definitions were tested and results were similar between the control and experimental groups. We used this definition to make PCPs as similar as possible in the two groups. This was the most conservative definition because it tended to overestimate PCPs in the experimental group and therefore any differences in PCP use between the two groups would be underestimated.

The only serious disparity in the two groups was months of exposure to the plan. As shown in Table VII-2, there was more attrition in the experimental group (44.2 percent of the people remained in the plan for a full 12 months) than the control group (50.5 percent remained in the plan for a full 12 months). We attempted to adjust for bias introduced by differences in exposure for the two groups by including only enrollees with at least six months' exposure in calculating annualized utilization rates and charges.*

There are no important differences in sociodemographic, social structural and health status characteristics between the control and experimental groups either for individuals or for families (Tables VII-3 and VII-4). Health insurance coverage between the control and experimental groups is also similar. Control group subscribers had more spouses who also were state employees with their own state health insurance than the experimental group but this was not statistically significant (Table VII-5).

However, there are significant differences between the groups in usual source of care (Table VII-6). A significantly higher percentage of people in the experimental group than the control group had a previous usual source of care who was a family or general practitioner or a participating UHC PCP. And, persons in the experimental group tended to choose a UHC PCP who was a family or general practitioner.**

The effect of these three variables on the results would be to underestimate the differences between the control and experimental groups with regard to PCP control. That is, other things being equal, people in the experimental group would have been more likely to use family and general practitioners and have lower use of services than the control group. Since we hypothesize that the control group will use PCPs more frequently and have lower use of services, the bias introduced by these differences is in the other direction, i.e., the results will yield a conservative estimate of the differences between the control and experimental groups.

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* We analyzed key dependent variables, charges and use of services, for enrollees with at least six months' exposure, for enrollees with at least 8 months' exposure, and for enrollees with 12 months' exposure. Because neither use rates or charges differed significantly for these three groups, we chose enrollees with at least six months' exposure in order to include as large a number of people as possible.

**Since the UHC plan requires individuals to choose a PCP at the time of enrollment and because we could not contact individuals and ask them to participate in the study until they had enrolled in UHC, many enrollees had already chosen a UHC PCP.

TABLE VII-2
DISTRIBUTION OF EXPOSURE MONTHS FOR CONTROL AND EXPERIMENTAL GROUPS (PERSON-BASED)

Months In Plan	Control (n=1419)	Experimental (n=1408)	P-value
1	.3%	.4%	
2	1.2	1.1	
3	1.0	1.2	
4	.9	1.6	
5	1.2	1.2	
6	1.0	1.3	.05
7	1.1	.7	
8	7.4	8.5	
9	13.1	16.3	
10	10.5	10.3	
11	11.8	13.3	
12	50.5	44.2	
Total Population			
Mean (mo.)	10.47	10.25	.01
S.D.	2.17	2.26	
Enrollees with at least 6 months of exposure			
Mean	10.93	10.75	.03
S.D.	1.38	1.51	

TABLE VII-3
SOCIODEMOGRAPHIC AND HEALTH STATUS CHARACTERISTICS OF CONTROL AND EXPERIMENTAL GROUPS (PERSON-BASED)

Variable	Control (n=1419)	Experimental (n=1408)	P-value
Age (years):			
0-5	9.2%	8.3%	
6-17	24.3	24.6	.20
18-44	52.8	50.7	
45+	13.7	16.3	
Mean (years)	26.85	27.71	.15
S.D.	15.80	16.00	
Sex			
Male	46.2%	46.3%	
Female	53.8	53.7	.94
Relationship to Subscriber:			
Subscriber	39.1	39.6	
Spouse	22.6	21.3	.70
Dependent	38.3	39.1	
General Health Status:			
Excellent	73.6	74.0	
Good	23.0	23.4	.42
Fair	3.3	2.2	
Poor	.1	.4	

TABLE VII-4
SOCIAL STRUCTURAL VARIABLES FOR CONTROL AND EXPERIMENTAL GROUPS (FAMILY-BASED)

Variable	Control (n=555)	Experimental (n=558)	P-value
Married Subscriber	61.5%	57.2%	.15
Family Composition:			
Subscriber only	29.4	33.2	.25
Subscriber & spouse	21.8	17.4	
Subscriber & dependents	12.8	13.1	
Subscriber, spouse & dependents	36.0	36.4	
Family Size (persons):			
1	29.4	33.2	.05
2	29.2	23.8	
3	14.2	15.4	
4	17.3	15.8	
5	5.8	9.1	
6+	4.1	2.7	
Mean (persons)	2.56	2.52	.71
S.D.	1.50	1.46	
Months of Residence			
Mean	167.87	183.62	.11
S.D.	156.56	173.35	
Subscriber Years of Education			
$\geq$ 13	78.3%	78.1%	.95
Mean (years)	15.60	15.67	.72
S.D.	3.24	3.14	

TABLE VII-4 (continued)

Variable	Control (n=555)	Experimental (n=558)	P-value
Spouse Years of Education:*			
$\geq$ 13	76.5%	72.4%	.24
Mean (years)	15.09	14.84	.28
S.D.	2.95	2.94	
Family Income (dollars):			
Under 10,000	15.1%	16.2%	
10,000 - 20,000	43.1	41.4	.93
20,000 - 30,000	25.8	26.1	
Over 30,000	16.0	16.4	
Subscriber Employed by Higher Education	70.3	70.6	.90
Subscriber Employed Fulltime	93.2	91.8	.38
Spouse Employed*	65.7	66.7	.81
Spouse Employed Fulltime:*	54.7	53.9	.84
Family Scale:**			
1	15.1	12.4	
2	22.5	23.7	
3	8.1	6.8	
4	5.4	7.7	
5	10.1	9.9	.11
6	2.5	1.4	
7	22.7	22.8	
8	7.6	7.3	
9	5.6	5.7	
10	.4	2.3	

TABLE VII-4 (continued)

*Sample includes only married subscribers (C=340,E=317).

**Key to "Family Scale" variable:

1 - Married, no children, subscriber < 40
2 - Single, no children, subscriber < 40
3 - Married, no children, subscriber > 40
4 - Single, no children, subscriber > 40
5 - Married, with youngest child > 18
6 - Single, with youngest child > 18
7 - Married, with youngest child between 6 years and 18
8 - Single, with youngest child between 6 years and 18
9 - Married, with youngest child < 6 years
10 - Single, with youngest child < 6 years

For the conceptual basis of this scale please refer to Chapter V, Choice of Plan.

TABLE VII-5
HEALTH INSURANCE FOR CONTROL AND EXPERIMENTAL GROUPS (FAMILY-BASED)

Variable	Control (n=555)	Experimental (n=558)	P-value
Previous Health Plan:			
BC	45.0%	45.5%	
GHC	20.5	20.3	.99
Other	34.4	34.2	
Spouse with State Health Insurance*	14.4	9.4	.12
Other Hospital Insurance	26.6	28.2	.56
Other Outpatient Insurance	20.4	21.9	.54
Other Health Insurance at Follow-Up	27.9	27.5	.87

*Sample includes only married subscribers (C=340, E=317).

TABLE VII-6
USUAL SOURCE OF CARE FOR CONTROL AND EXPERIMENTAL GROUPS (PERSON-BASED)

Variable	Control (n=1419)	Experimental (n=1408)	P-value
Usual Source of Care Preswitch	82.9%	84.2%	.33
Specialty of Former Usual Source of Care:			
Family/General Pract.	49.6	57.1	
Pediatrician	22.7	21.7	
Internist	13.9	9.5	
Obstetrician/ Gynecologist	8.0	6.2	.01
Surgeon	.9	.7	
Other Physician	4.0	3.3	
Non-Physician	.9	1.5	
UHC PCP Chosen	86.8	86.3	.71
Usual Source of Care is UHC PCP	45.4	49.5	.03
Specialty of UHC PCP:			
Family/General Pract.	56.6	63.1	
Pediatrician	17.9	16.2	
Internist	19.3	15.6	.01
Obstetrician/ Gynecologist	3.9	3.8	
Other	2.3	1.2	
Ever Seen UHC PCP:*			
No	35.2	33.9	.50
Yes	64.8	66.1	

*Sample includes only those who chose UHC PCP (C=1241, E=1235).

Control and Experimental Group Choice and Use of the Plan

Tables VII-7 and VII-8 show the reasons for choice of UHC and reasons for choice of a UHC PCP. The rank ordering of the most important reason for switching to UHC is very similar for the control and experimental groups. The reasons given for switching, in order of importance, were: (1) full benefits and coverage; (2) lower out-of-pocket costs; (3) freedom to choose provider; (4) had already been seen by a physician on the UHC list of participating PCPs; and (5) less administrative problems in submission and payment of claims. The reasons individuals gave for choosing a UHC PCP were also very similar between the control and experimental groups. The most frequent responses were: (1) easy access to the physician; (2) personal attributes of the PCP; and (3) had been seen at an earlier time by the PCP.

The results from the mail questionnaire, shown in Table VII-9,* allowed assessment of enrollees' use and satisfaction with the plan during the previous year. The control and experimental groups reported similar use of UHC compared to other health insurance plans and in changes in number of health care visits. This provided us with some evidence that enrollees in both groups were using the plan to the same extent.

The mail questionnaire also provided information about how the two groups used UHC PCPs. Although the experimental group was not required to choose a PCP, the initial enrollment information received by subscribers from UHC asked them to select one. At the time of the interview, 86.3 percent of the experimental group had chosen a UHC PCP and 66.1 percent had visited that physician before (Table VII-6). Thus, even though the experimental group was not required to choose a PCP or have that physician approve all their care, they may have done so and therefore the differences between the control and experimental groups would tend to be underestimated. However, the experimental group consequently reported significantly higher use of specialists and emergency rooms without obtaining PCP approval than the control group; this indicates that the experimental group was not restrained by PCPs in their use of services. On the other hand, since only 7.5 percent of the families in the control group reported at least one specialist or emergency room claim that was refused for payment, it appears that most referral care for the control group was approved by PCPs.

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*The reliability of some information on the mail survey may be questionable. For example, the control and experimental groups were both unreliable in reporting any use of services on the mail questionnaire as compared to the claims record. Inconsistent reporting was observed for 7.2 percent of control group families and 13.6 percent of experimental group families.

TABLE VII-7
MOST IMPORTANT REASON FOR CHOOSING UNITED HEALTHCARE (FAMILY-BASED)

Reason	Control (n=553)	Experimental (n=555)	P-value
Increased coverage	25.5%	25.2%	.92
Lower out-of-pocket costs	21.3	18.2	.19
Freedom to choose provider	9.0	13.5	.02
Already seen by physician on list	8.7	10.5	.32
Administration	7.8	10.3	.15
Access	7.6	6.3	.40
Preventive care	5.4	3.6	.14
Recommendation	3.1	4.3	.27
Quality of care	2.5	3.2	.48
Wanted a PCP	4.0	1.3	.01
Access to physician	3.1	1.6	.11
Other	2.0	3.8	.99

TABLE VII-8
MOST FREQUENT REASONS FOR CHOOSING A UNITED HEALTHCARE PRIMARY CARE PHYSICIAN (PERSON-BASED)

Reason	Control (n=1418)	Experimental (n=1404)	
	% Giving Reason		P-value
Good Access	35.4	32.3	.08
Physician Personal Attributes	32.7	32.1	.73
Already Seen by Provider	31.1	33.4	.19
Lay Recommendation	28.3	27.4	.61
High Quality of Care	23.3	24.1	.65
Physician Professional Attributes	18.4	17.8	.68
Convenience	12.8	12.9	.92
Physician Recommendation	10.0	9.4	.58
Random Choice From List of UHC Approved PCPs	6.0	4.8	.15
PCP Known by Respondent	3.1	4.1	.14
Referral Satisfaction	3.7	2.6	.07
Other	2.8	2.8	.96

TABLE VII-9
USE OF PLAN BY CONTROL AND EXPERIMENTAL GROUPS (FAMILY-BASED)

Variable	Control (n=555)	Experimental (n=558)	P-value
UHC Use Compared to Other Plan(s):*			
UHC less	20.9%	15.9%	.35
UHC equal	26.1	33.3	
UHC more	53.0	50.8	
Proportion of Claims Submitted:			
All	66.5	71.8	
Most	19.9	18.3	
Some	6.0	3.2	.23
Few	2.7	2.1	
None	4.9	4.7	
Specialist, Emergency Room Use	53.1	61.9	.02
Visits to Specialist, Emergency Room Without Approval:			
0	60.6	26.6	
1	24.4	30.7	
2	10.6	20.7	.00
3	2.4	7.9	
4+	2.0	14.1	
Out-Of-Pocket Expenses (dollars):			
0	20.1	24.2	
1-49	53.4	54.5	
50-99	13.5	9.1	.19
100-149	5.8	6.3	
150-199	2.9	1.7	
≥ 200	4.3	4.1	
Change in Health Care Visits:			
Less	6.9	5.2	
Same	84.5	84.4	.37
More	8.6	10.4	

TABLE VII-9 (continued)

Variable	Control (n=555)	Experimental (n=558)	P-value
Satisfaction With UHC:			
Very satisfied	63.7%	74.5%	
Somewhat satisfied	23.0	13.5	
Somewhat dissatisfied	7.8	3.7	.00
Very dissatisfied	1.6	1.4	
No use	3.9	7.0	
Specialist, Emergency Room Claims Refused for Payment:			
Yes	7.5	Question	
No	42.8	Not	
No use	45.7	Asked	N.A.
None submitted	4.0		

*For subscribers with another form of health coverage (C=145, E=142).

We were concerned that the experimental group may not have submitted all claims to the plan and therefore this would tend to underestimate the differences between the two groups. However, we have no evidence that this was true and in the mail questionnaire people said that they had submitted all or most claims to the plan. A further indication of the experimental group's appropriate submission of claims was that their out-of-pocket expenses were similar to those of the control group. Lastly, as expected, the experimental group was more satisfied with its plan than the control group.

We also assessed differences between control and experimental group subscribers continuing with the UHC plan after the 1980 open enrollment. There was no difference between the two groups in the percent of families switching from UHC during the 1980 open enrollment. Those families who were less satisfied with the plan and had lower in-plan charges chose not to remain with UHC in 1980. Out-of-pocket costs were not a factor in switching from UHC to another plan.

In summary, the two groups are composed of enrollees with similar characteristics and each group used the plan as predicted. The only potentially important difference between the two groups is length of time in the plan, with the experimental group having fewer months of exposure to the plan, but this only amounts to six days difference in mean exposures. This difference is adjusted in further analyses by examining data only for enrollees with at least six months of exposure and annualizing the results.

Analysis Plan

We first present univariate results and then multivariate results. For the univariate analyses, we examined charges and use of services for the control and experimental groups without controlling for other variables which affect these dependent variables because randomization had provided us with similar groups. As a result charges and use rates are presented without age-sex standardization** Some results are presented for the entire population to indicate total experience during the study period; in order to provide more stable estimates, other results are presented only for enrollees with at least six months of exposure.

Although, in general, nontransformed data are presented, we also used log-transformed data to control for the skewed distribution of charges and visits. After testing a number of transformations we found that log (charges + 5) and log (visits + 1) were the most normally distributed (Volume II, Appendix VII.4).

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*We computed all rates with and without age-sex adjustment and there were no important differences between the crude and adjusted rates.

Differences between the two groups were tested using chi-square or t-tests. We first looked at charges then use of services and these are broken down by total inpatient and ambulatory care. Finally, to more carefully assess PCP control, we examined ambulatory services for users only. Charges and use of services were broken down by total, inpatient and ambulatory.

Differences in Charges between Groups

We first looked at differences between the control and experimental groups for the dependent variable of primary interest, billed charges. Tables VII-10, VII-11 and VII-12 present the distributions of total charges, inpatient charges and outpatient charges, respectively, for each group. Fifty percent of total charges to the plan were incurred by those enrollees with at least $1000 in charges (approximately 5 percent of all enrollees). During the study period, approximately 75 percent in each group had outpatient charges while about 5 percent in each group had inpatient charges. . The total and inpatient charges for the experimental group exceeded but were not significantly different from those of the control group. However, outpatient charges were significantly higher in the experimental than the control group.

Because UHC PCPs are not responsible for charges over $5000 for any patient in their panel (charges over $5000 are reinsured by SAFECO), we also compared the groups excluding any individual's costs over $5000; thus, charges over $5000 were recoded to $5000 for five people in the control group and six in the experimental group. As shown in Tables VII-10 through VII-12, removing charges greater than $5000 did not change the significance of the differences between the groups but altered the direction of difference for inpatient charges. The significance of the results also was not changed by completely removing the outliers' and their total charges (Volume II, Appendix VII.5).

In an attempt to control for differences in exposure, we examined annualized charges for enrollees with at least six months' exposure to the plan (Table VII-13). Again, we found that although experimental group charges are higher than the control group for total, inpatient and outpatient charges, they are significantly higher only for outpatient charges.*

Experimental and control group differences in annualized charges are $6 per year for inpatient charges; $31 per year for outpatient charges; and $37 per year for total charges (Table VII-13). Based on 95-percent confidence intervals

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*For this subsample when we remove outliers' charges greater than $5000, total charges per person per year are significantly different between groups.

TABLE VII-10
TOTAL CHARGES* FOR CONTROL AND EXPERIMENTAL GROUPS
(PERSON-BASED)

Total Charges	Control (n=1419)	Experimental (n=1408)	P-value
$0	25.8%	22.6%	
1-250	56.6	54.5	
251-500	9.1	11.9	
501-1000	4.8	5.6	.15
1001-2000	2.7	3.2	
2001-5000	1.5	1.8	
>5000	.4	.4	
Charges			
Mean	$239	$254	.61
S.D.	$921	$627	
Removing Charges >$5000**			
Mean	$210	$248	.06
S.D.	$506	$569	

*This table includes all billed charges minus deductibles and copayments. All charges are rounded to the nearest dollar.

**Five people in the control group and six people in the experimental group had more than $5000 in charges during the study period. Total charges for these enrollees were recoded to $5000. Average charges over $5000 was $8158 for the control group and was $1416 for the experimental group.

TABLE VII-11
INPATIENT CHARGES* FOR CONTROL AND EXPERIMENTAL GROUPS WITH AND WITHOUT REMOVING PER PERSON CHARGES GREATER THAN $5000

Dollars	Total Inpatient Charges		Removing Charges > $5000	
	Control (n=1419)	Experimental (n=1408)	Control (n=1419)	Experimental (n=1408)**
0	95.5%	95.0%	95.5%	95.0%
1-250	.5	0	.5	0
251-500	.7	.4	.7	.4
501-1000	.8	1.6	.8	1.6
1001-2000	1.3	1.4	1.3	1.4
2001-5000	.8	1.3	1.1	1.6
>5000	.3	.2	0	0
Mean	$ 93	$ 87	$ 66	$ 82
S.D.	835	506	399	446
t-test P-value	.82		.33	

*This table includes all billed charges minus deductibles and copayments. All charges are rounded to the nearest dollar.

**Five people in the control group and six people in the experimental group had more than $5000 in charges during the study period.

TABLE VII-12
OUTPATIENT CHARGES* FOR CONTROL AND EXPERIMENTAL GROUPS WITH AND WITHOUT REMOVING PER PERSON CHARGES GREATER THAN $5000

Dollars	Total Outpatient Charges		Removing Charges > $5000	
	Control (n=1419)	Experimental (n=1408)	Control (n=1419)	Experimental (n=1408)**
$0	25.9%	22.8%	25.9%	22.8%
1-250	57.7	56.5	57.7	56.5
251-500	9.3	12.7	9.4	12.7
501-1000	5.1	5.8	5.1	5.9
1001-2000	1.9	1.9	1.9	1.8
>2000	.1	.3	0	.1
Mean	$146	$167	$144	$166
S.D.	242	271	228	267
t-test P-value	.03		.02	

*This table includes all billed charges minus deductibles and copayments. All charges are rounded to the nearest dollar.

**Five people in the control group and six people in the experimental group had more than $5000 in charges during the study period.

TABLE VII-13
ANNUALIZED CHARGES* FOR ENROLLEES WITH AT LEAST SIX MONTHS' EXPOSURE FOR CONTROL AND EXPERIMENTAL GROUPS

Variable	Control (n=1354)	Experimental (n=1327)	P-value
Inpatient Charges Per Year	$96	$102	.83
Outpatient Charges Per Year	166	197	.01
Outpatient Visit Charges Per Year	71	88	.00
Total Charges Per Year	262	299	.28
Total Charges Removing Per Person Charges >$5000**	231	293	.01

*This table includes all billed charges minus deductibles and copayments. All charges are rounded to the nearest dollar.

**If total charges were greater than $5000 for an enrollee, the total was recoded to $5000.

(Volume II, Appendix VII.6) we can be reasonably certain that the control group had lower outpatient charges and that this difference is no more than $53. Taking into account the inherent variability in the inpatient data we can be 95-percent confident that the underlying difference in plans is not more than $64 per year for inpatient charges and $105 per year for total charges. Since $105 per year is about one-third of the total charges per year, there is room for sizeable differences which might be detected by a study with a larger population.

In summary, there are no significant differences between the control and experimental groups for inpatient charges or total charges, but outpatient charges are significantly higher for the experimental group. However, based on a 95-percent confidence interval, the difference in inpatient charges would be just as big or larger than the difference in outpatient charges.

Differences in Use between Groups

We next examined annualized rates of use for enrollees with at least six months of exposure. There was no significant difference between the control and experimental groups for hospital use (Table VII-14).* The groups did not differ significantly in hospital admissions per 1000 person years, hospital days per 1000 person years, hospital days per 1000 person years for users only or average length of stay. However, the rates for the control group were lower on each indicator of inpatient use than those of the experimental group: the experimental group had 25 percent more admissions and 50 percent more hospital days per 1000 per years. These differences may not be significant due to our small sample size. Thus, the PCP/UHC system did not seem to have any statistically significant control over hospitalizations or, alternatively, that both groups were equally successful in controlling hospitalizations.

As shown in Table VII-15, there was a significantly higher percentage (78.75 percent) of people in the experimental group who had at least one claim than in the

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*Nor is there any difference between groups in the distribution of hospital admissions when the total population is examined (Volume II, Appendix VII.7).

TABLE VII-14
ANY USE OF SERVICES AND ANNUALIZED HOSPITAL USE FOR ENROLLEES WITH AT LEAST SIX MONTHS' EXPOSURE FOR CONTROL AND EXPERIMENTAL GROUPS

Variable	Control (n=1354)	Experimental (n=1327)	p-value
Percent ≥ One Hospital Admission	4.28	4.97	.40
Percent ≥ Two Hospital Admissions	.44	.60	.57
Hospital Admissions per 1000 Person Years	52	66	.22
Hospital Days Per 1000 Person Years	215	321	.20
Average Length of Hospital Stay*	3.76	5.18	.20

*Includes hospital users only (C=58, E=66).

TABLE VII-15
ANNUALIZED AMBULATORY USE FOR ENROLLEES WITH AT LEAST SIX MONTHS' EXPOSURE FOR CONTROL AND EXPERIMENTAL GROUPS

Variable	Control (n=1354)	Experimental (n=1327)	P-value
Percent Enrollees With At Least One Claim	75.11	78.75	.03
Percent of Enrollees $\geq$ One Ambulatory Visit	69	71	.45
Ambulatory Visits Per Year	3.13	3.52	.05
Ambulatory Visits to PCP Per Year	2.39	2.40	.94

control group (75.11 percent).* (Based on our sample size we are 95-percent confident that the underlying difference between the plans is no greater than 7 percent, c.f. Volume II, Appendix VII.6).

A slightly higher percentage of enrollees in the experimental than the control group had at least one ambulatory care visit to a hospital outpatient clinic or physician's office but this was not statistically significant (Table VII-15). However, there were significantly more ambulatory visits per year in the experimental than the control group. (Based on our sample size, we were 95-percent confident that the underlying difference is not greater than .78 visits per year, c.f. Volume II, Appendix VII.6). Ambulatory care visits to PCPs per year were similar in the two groups.

Thus it appears that the standard UHC plan decreased use because the control group had a significantly lower percentage of people who had any claim and had significantly fewer ambulatory visits per year than the experimental group. Although inpatient use was not significantly different between groups, the experimental group had higher use for each indicator of inpatient use.

Effect of the PCP on Charges and Use in the Two Groups

In order to assess the effect of PCPs on charges and use of services in each group, we analyzed only users with at least six months of exposure. We believed that users were more likely to reflect PCP control because the effect of the PCP could only be measured if one entered the service system.

Table VII-16 shows that total charges and inpatient charges did not differ significantly between the two groups. However, outpatient charges were significantly higher for the experimental than the control group. This difference appeared to be related to the use of specialists: charges for visits to non-PCPs physicians are significantly higher in the experimental than the control group.

Table VII-17 presents PCP and non-PCP ambulatory care services for users. We examined outpatient procedures only, assuming PCPs would have more control of ambulatory than hospital use. When we look at various types of ambulatory

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*Volume II, Appendix VII.8 shows that employer--higher education or other state agency--did not significantly affect percentage with a claim. However, there was a significant effect of previous health care plan ($p<.001$); a higher percentage of former BC enrollees submitted at least one claim to UHC than former GHC enrollees and in turn, a higher percentage of former GHC enrollees submitted at least one claim to UHC than new employees from other plans.

TABLE VII-16

CHARGES* FOR USERS ONLY WITH AT LEAST SIX MONTHS' EXPOSURE FOR CONTROL AND EXPERIMENTAL GROUPS. OVERALL CHARGES (ALL) ARE PRESENTED AS WELL AS CHARGES BROKEN DOWN BY PCP AND NON-PCP

Charges	Provider	Control (n=1017)	Experimental (n=1045)	P-value
Total	All	$349	$380	.48
	PCP	129	144	.14
	Non-PCP	220	236	.68
Inpatient	All	127	130	.95
	PCP	14	24	.13
	Non-PCP	114	105	.81
Outpatient**	All	221	250	.04
	PCP	115	120	.48
	Non-PCP	106	131	.02
Ambulatory Visit	All	94	112	.01
	PCP	67	68	.67
	Non-PCP	28	43	.00

*This table includes all billed charges minus deductibles and copayments. All charges are rounded to the nearest dollar.

**Includes ambulatory visit charges.

TABLE VII-17

AMBULATORY SERVICES FOR USERS ONLY WITH AT LEAST SIX MONTHS' EXPOSURE FOR CONTROL AND EXPERIMENTAL GROUPS. OVERALL RATES (ALL) ARE PRESENTED AS WELL AS RATES BROKEN DOWN BY PCP AND NON-PCP

Variable	Provider	Control (n=1017)	Experimental (n=1045)	p-value
Number of Ambulatory Visits	All	4.17	4.47	.22
	PCP	3.18	3.05	.39
	Non-PCP	.99	1.42	.01
Medical Procedures Charges	All	$12.96	$16.91	.02
	PCP	5.25	8.77	.00
	Non-PCP	7.71	8.14	.70
Surgical Procedures Charges	All	$24.38	$24.79	.94
	PCP	9.55	13.50	.20
	Non-PCP	14.82	11.29	.33
Radiological Procedures Charges	All	$20.16	$22.70	.25
	PCP	-**	-	-
	Non-PCP	-	-	-
Laboratory Procedures Charges	All	$25.59	$24.75	.67
	PCP	-	-	-
	Non-PCP	-	-	-

*This table includes all billed charges minus deductibles and copayments.

**Radiologic and laboratory procedures were not analysed by PCP and non-PCP due to unreliable data in these categories.

care procedures broken down by PCP and non-PCP, we see that surgical, radiologic and laboratory procedures did not differ between the groups or between PCPs and non-PCPs. However, medical procedures were significantly higher for the experimental group than for the control group and this was significant only for PCPs.

Although the experimental group has significantly more ambulatory visits to PCPs, enrollees in both experimental and control groups had more visits to PCPs than non-PCPs. PCPs seen by the experimental group members ordered more medical procedures than their peers caring for individuals in the control group. Unfortunately, our definition of PCP does not allow us to separate internists and obstetrician/gynecologists from family and general practitioners and pediatricians. Charges and use of services for all enrollees with greater than or equal to six months' exposure are shown in Volume II, Appendix VII.9.

In summary, PCPs appear to have no effect on total or inpatient charges. We can be 95-percent confident that the PCP total charges per year for the control group is at most $35 less than for the experimental group, while at the same time the data could support a difference of $5 in the opposite direction. Similarly, with 95-percent confidence, inpatient charges per year are at most $25 less in the control group but may be up to $3 more. The control group had slightly higher outpatient PCP charges and this difference was not significant. Furthermore we can be 95-percent confident that this difference is no more than $17 and may be $9 in the opposite direction. Non-PCPs had significantly higher charges for the experimental group. Thus the PCP/UHC system limited non-PCP charges for the control group and, because there were no restrictions on the experimental group, non-PCP charges were higher. The experimental group also had a higher number of ambulatory visits to non-PCPs, indicating that enrollees were going directly to specialists or that experimental group PCPs were referring more often to specialists. There is also evidence that control group PCPs were limiting their use of medical procedures or using less expensive procedures compared with the behavior of experimental group PCPs.

Multivariate Analysis

The previous sections have presented univariate analyses, looking at use as a function of randomization status with no regard to the many other factors related to such use. As previous analysis deomonstrated, random assignment of families to plans distributed risk variables in the two groups. Thus, the need for multivariate analysis is not great, and, consequently, the analysis here is not as detailed as in the Comparative Utilization chapter where variables were controlled because of enrollee differences in the three plans.

A limited multivariate analysis was performed for two reasons. First, we used multivariate analysis to reduce or explain the variability in the dependent variables by use of control variables, permitting the detection of smaller differences between the two groups. Second, we used multivariate analysis to examine interactions between randomization status and other variables, e.g., variables such as health status which might have a different effect on use in one plan than in the other.

We decreased the number of dependent variables examining only: inpatient, outpatient and total charges, all of which were log charges. The analysis was restricted to those persons with at least six months of enrollment. These choices were made to keep the analysis simple, while providing stable estimates.

Two types of independent variables were chosen for the multivariate analysis: blocking variables and other control variables. The blocking variables, previous health plan and type of employer, were considered separately because we used balanced randomization to achieve equal numbers of families in each category. Because of the randomization strategy, these variables were automatically controlled in the univariate analysis. Here, they are examined in relationship to charges as if they had not been controlled by the design.

The multiple regression results predicting log-charges indicate that, in general, the blocking variables were related to charges. Compared to employees in other state agencies, higher education employees had significantly lower inpatient charges ($p=.01$) and lower, but not statistically significant outpatient charges. Type of employer is not significant for total charges, but having BC or GHC as a previous health plan is significant ($p=.01$, $.03$, respectively). People coming from BC and GHC use outpatient services quite similarly, both having significantly higher outpatient charges ($p < .01$ for both) than new state employees previously covered by "other" plans.

In an attempt to interpret the multivariate results we examined charges (total, inpatient and outpatient) by employer, previous health plan and group status (Table VII-18 through VII-20, respectively). These tables are for untransformed charges and consequently given somewhat different results than the multiple regression results on log-transformed charges. Former BC and GHC enrollees have significantly higher outpatient charges than new employees (Table VII-20). The results for untransformed total and inpatient charges are not statistically significant (Tables VII-18 and VII-19).

From the many independent variables of the second type, the "control" variables, a few were chosen for inclusion in

TABLE VII-18
TOTAL CHARGES* BY EMPLOYER, PREVIOUS HEALTH PLAN AND GROUP STATUS**

Employer	Previous Health Plan	Control (n=1419)	Experimental (n=1408)	Total
Higher Education	BC	$239	$249	$244
	GHC	160	291	222
	Other	230	197	213
Other State Agency	BC	182	307	244
	GHC	352	291	322
	Other	338	272	307
Total		239	254	247

*This table includes all billed charges minus deductibles and copayments. All charges are rounded to the nearest dollar.

**ANOVA results indicate that none of the main effects employer previous health plan and group status) are statistically significant.

TABLE VII-19
INPATIENT CHARGES BY EMPLOYER, PREVIOUS HEALTH PLAN AND GROUP STATUS

Employer	Previous Health Plan	Control (n=1419)	Experimental (n=1408)	Total
Higher Education	BC	$ 82	$ 71	$ 76
	GHC	38	97	65
	Other	90	63	76
Other State Agency	BC	47	144	95
	GHC	158	103	132
	Other	222	108	169
Total		93	87	90

*This table includes all billed charges minus deductibles and copayments. All charges are rounded to the nearest dollar.

**ANOVA results indicate that none of the main effects employer previous health plan and group status) are statistically significant.

TABLE VII-20
OUTPATIENT CHARGES BY EMPLOYER, PREVIOUS HEALTH PLAN AND GROUP STATUS

Employer	Previous Health Plan	Control (n=1419)	Experimental (n=1408)	Total
Higher Education	BC	$157	$178	$167
	GHC	122	194	156
	Other	139	134	137
Other State Agency	BC	135	163	149
	GHC	194	187	190
	Other	116	164	138
Total		146	167	157

*This table includes all billed charges minus deductibles and copayments. All charges are rounded to the nearest dollar.

the multivariate analysis because they were significantly related to randomization status (showing significant differences between control and experimental groups) or were significantly (or theoretically) related to total charges. These selected control variables are shown in Table VII-21.

We also tested a number of interaction terms. After controlling for other independent variables, significant interactions were AGE by SEX and AGE by SEX. Other interactions were examined and found to be non-significant.

Regression analysis allowed examination of the relationships between charges and specific variables while controlling all other variables. When all the variables were in the regression equation, of the two blocking variables, only previous health plan was significantly related to charges; employees with previous enrollment in GHC had significantly higher charges than employees from "other" plans. For the control variables, regression analysis indicated that age, sex, usual source of care preswitch, possession of other hospital coverage, UHC PCP chosen, family composition, months of exposure to the plan, health status, family size, previous health plan of new employee and subscriber or dependent status were related to use. The directions of these differences are shown in Table VII-22.

We next performed multiple regression to determine whether controlling for any of these variables affects the significance of the control or experimental group status. In general, group status remains significant after controlling for main and interaction effects of the blocking variables. Table VII-23 shows the regression coefficient and the statistical significance of the group status variable predicting total, inpatient and outpatient charges after controlling for the blocking variables, and also after controlling the blocking and other independent variables for the total sample and for users. The dependent measure is the natural logarithm of (charges + 5), chosen because its distribution was the most "normal" of the various transformations tried.

Looking first at the total sample, we can see that total charges and ambulatory charges, even after controlling for other factors, are significantly higher for experimental than the control group. The difference between the two groups in hospital charges was not significant although in the same direction, as the other charges. Failure to find a significant difference for hospital charges may be due to the high amount of variability in hospital costs from person to person; with such variability a larger sample size is necessary for detecting statistical significance.

For users, charges for the experimental group were higher but not significantly different from those for the control

TABLE VII-21
VARIABLES SIGNIFICANTLY RELATED TO GROUP STATUS AND TOTAL CHARGES

	Variables Significantly Related To:*				
		Total Sample		Users Only	
Variable**	Group Status	Total Charges (log transformed)	Number of Claims (log transformed)	Total Charges (log transformed)	Number of Claims (log transformed)
Sex		X	X	X	X
Other hospital insurance	X	X	X	X	X
Health status		X	X	X	X
Usual source of care preswitch		X	X	X	X
Usual source of care is UHC PCP	X			X	
Annual family income		X	X	X	X
Age		X	X		
Family size	X	X	X	X	X
Family scale	X	X	X	X	
Months in plan	X	X	X	X	
Months of residence		X	X	X	X
Subscriber (yes/no)		X	X	X	X
Spouse (yes/no)		X	X		
Family composition is subscriber only (yes/no)		X	X	X	X
Family composition is subscriber and spouse only (yes/no)					X

TABLE VII-21 (continued)

Variable**	Variables Significantly Related To:*				
		Total Sample		Users Only	
	Group Status	Total Charges (log trans-formed)	Number of Claims (log trans-formed)	Total Charges (log trans-formed)	Number of Claims (log trans-formed)
Family composition is subscriber and dependents only (yes/no)					X
Previous health plan for new hires: none (previous employee)	X	X	X		X
Previous health plan for new hires: BC-KCM	X		X		X
Previous health plan for new hires: HMO-GHC	X				
UHC PCP chosen		X	X		

*The relationship between the independent variables and the selected dependent variables was considered to be significant if the p value for the simple correlation was $\geq$ .05.

**Exact variable definitions may be found in Appendix VII-1.

TABLE VII-22
VARIABLES SIGNIFICANTLY RELATED AMBULATORY CHARGES (LOG TRANSFORMED): ZERO ORDER AND CONTROLLED FOR OTHER VARIABLES

Variable	Zero-Order Correlation*	P-Value Controlled For Other Variables**
Sex	.19	.000 (SEXAGE,SEXASQ)
Other hospital insurance	-.13	-.000
Health status	.15	.000
Usual source of care preswitch	.09	.002
Usual source of care is UHC PCP	.03	
Annual family income	-.08	
AGESQ	.14	.000
Age	.13	.000
Family size	-.17	-.000
Family scale	-.09	
Months in plan	.18	.000
Months of Residence	.05	
Subscriber (yes/no)	.19	.000
Spouse (yes/no)	-.06	.019
Family composition is subscriber only (yes/no)	.12	
Family composition is subscriber and spouse only (yes/no)	.03	
Family composition is subscriber and dependents only (yes/no)	.01	-.013

TABLE VII-22 (continued)

Variable	Zero-Order Correlation*	P-Value Controlled For Other Variables**
Previous health plan for new hires: none (previous employee)	.05	-.025
Previous health plan for new hires: BC-KCM	-.02	
Previous health plan for new hires: HMO-GHC	-.03	
UHC PCP Chosen	.12	.000

*A correlation greater than .038 or less than -.038 is statistically significant ($p < .05$).

**Partial correlations were performed controlling for all other variables listed in this table plus the blocking variables, group status and their interactions. Only significant p-values are shown. The sign indicates the direction of the relationship between the independent variable and ambulatory charges.

TABLE VII-23
SIGNIFICANCE OF GROUP STATUS AFTER CONTROL FOR OTHER VARIABLES

Type of Charges	Total Sample		Users Only	
	Block**	B+control#	Block	B+control
Total charges	.023	.001	.182	.070
Hospital charges	.389	.362	.548	.589
Ambulatory charges	.036	.002	.291	.143

*Table shows p-value for groups status afater control for blocking variables only or for the blocking variables plus the control variables. In every case, the experimental plan has higher use.

**Blocking variables include EMPLOYER (higher education versus other) and previous health plan coverage (BC, GHC, other) PREVBC, PREVGHC.

#Control variables include those listed in Table VII-7.

group, although the difference approached significance (p = .07) when total charges were considered.

The interactions between group status and the other variables did not significantly affect charges for the total sample or for users only.

The discrepancy in the findings for all people versus users suggests that the major differences between the two groups is in the propensity to use services at all, rather than the charges for people who do use services. Thus, the plan seems to have an effect on the enrollee rather than on the physician.

In summary, the multivariate analysis detected few differences between the control and experimental groups on key independent variables, yet many independent variables were significantly related to charges in both plans. Including these independent variables in the analysis did not change the findings of the univariate analysis in any substantial way, confirming the success of the randomized design.

DISCUSSION

Limitations of the Study and Generalizability of Results

There are a number of limitations of this study which may affect the results. First, the sample size is small for the analysis of rare events, e.g., hospitalizations. Given the 1,113 subscribers who chose UHC in 1979, what is the meaning of the differences in charges and use of services between the control and experimental groups? Although non-significance indicates that the difference between the two groups might be zero, a larger sample might have detected a significant difference. By estimating the range of differences between the two groups which could be supported by these data, we may speculate about the "importance" of these differences if a larger sample were available. Confidence intervals for major dependent variables are given in the results section and in Volume II, Appendix VII.6.

Second, the length of the study was limited to 12 months and this may have affected the results in three ways: (1) individuals in the experimental group may have used services differently because they knew that the experimental period was limited to one year; (2) 12 months may not have been a long enough period of time to detect differences between the plans, especially for services with low use, e.g., hospitalizations; and (3) because all of the subscribers were new enrollees to UHC, there may have been some period of time in which new enrollees learned how to use the plan which affected the results. We would expect this "learning period" to be more important for the control group than the experimental group because the control group had to adjust to more restrictions on their use of services than the experimental group. UHC recognized this "learning period" and allowed control group participants one unapproved self-referred visit. Enrollees were sent a letter informing them of their infraction of UHC rules stating that UHC would pay for the visit the first time but would refuse payment for subsequent unapproved care.

Third, it is unclear how closely this study replicates actual marketplaces--the experimental group may not be representative of existing plans. Few plans have comprehensive benefits, little enrollee cost sharing, and high access to care. In addition, our population consisted of subscribers and their family members who chose UHC rather than one of the other health insurance options available to them. These individuals may have been oriented to use PCPs more than the general population; therefore the differences between the control and experimental groups in this study may be underestimated if such an experiment were carried on in the real world. Fourth, the study design limits our ability to assess fully the role of the PCP in controlling use and charges. We cannot separate the effects of the PCP from the UHC system on charges or use of services because both are integral and inseparable components of the standard UHC plan (control group). We attempted a crude assessment of the separate effects of the PCP versus the UHC system by assuming that the major effect of the UHC system is to deter initial use and that the PCP effect could best be evaluated by examining users of services only. Furthermore, because our use and charges data are claims-based, we cannot distinguish patient-generated visits from physician-generated visits.

The results of the study can be generalized to other populations only cautiously. First, the population of interest in this study was a working population with higher levels of education, income and health status than the average in the general population. Second, we did not include retirees, so results cannot be generalized to an elderly population. Third, the practice of medicine and competitiveness of the medical market may be different in Seattle from other areas.

Controlling Charges and Use of Services

Overall, this study showed that the standard UHC plan (control group) had significantly lower ambulatory care charges and significantly fewer ambulatory visits and significantly lower medical procedure charges performed by PCPs than the experimental group. It is likely that annualized ambulatory care charges were not greater than $53 per year higher for the experimental group or .78 ambulatory visits higher for the experimental group. Medical procedures charges performed by PCPs are most likely no more than $6 lower for the control group. The plan did not have any significant effect on number of PCP visits or inpatient use and charges. The difference in inpatient charges between plans was not more than $64 per enrollee per year.

Although the design of this experiment does not allow us to fully separate the effects of the PCP from the effects of the UHC system, the results provide some evidence that the UHC system may have operated in the control group to limit initial use of services. The control group had a significantly lower percentage of enrollees who had any use of services. Furthermore, when we examined charges for the total sample, the control group had significantly lower total and ambulatory care charges than the experimental group but these differences disappear when we examine charges for users only.

This study also provides some evidence that UHC PCPs were controlling the use of services. The effect of PCP control was assessed for users only. PCPs for the control group had significantly lower charges for medical procedures than PCPs for the experimental group. Although there were no significant differences between control and experimental groups for PCP outpatient charges and number of PCP visits, the control group had significantly fewer ambulatory visits to specialists and as a result had significantly lower charges for outpatient care by specialists than the experimental group. Unfortunately, we do not know if these differences can be attributed to PCPs in the control group limiting referrals to specialists or whether the UHC system discouraged patients from seeking specialists' advice on their own. These are the minimum differences between the control and experimental groups because our PCP definition and the choice of UHC PCPs by the experimental group prior to our study would tend to underestimate any PCP differences between the groups. There is no evidence that the UHC system increased the number of ambulatory visits, e.g., by encouraging a "get-acquainted" visit with a PCP or by encouraging unnecesssary visits only to get PCP approval for a referral to a specialist.

In conclusion, it appears that the effect of PCP control and/or the UHC system did limit ambulatory use but not hospital use in the control group compared to the experimental group. These results indicate that the standard UHC plan may have been working effectively to decrease ambulatory charges and use of services. However, the question remains as to whether this decrease on the ambulatory side was sufficient for United Healthcare to remain competitive in the marketplace. The results of the Comparative Utilization Study presented in Chapter VI suggest that UHC had both high use and costs of care compared with Blue Cross and Group Health Cooperative. Thus, although the primary care physician may have limited ambulatory use in an experimental situation, the effect of the PCP may not have been sufficient to control costs when compared to competitors.

CHAPTER VIII

SUMMARY, CONCLUSIONS AND EPILOGUE*

INTRODUCTION

This multidimensional study focused on comparisons among three health care plans offered to Washington State employees in King County: Blue Cross of Washington and Alaska (BC), Group Health Cooperative of Puget Sound (GHC), and United Healthcare (UHC). The setting for the study provided a unique opportunity to address a number of issues related to multiple choice of plans and differential use and costs associated with health care organized and financed in different ways. These issues included success in obtaining agreements with physicians in the innovative UHC plan, the perceived impact of risk sharing on the part of physicians, the effects of practice penetration, the reasons for consumer choice of plan, the degree of adverse or favorable selection into the plans and the differences in services use and costs across the alternative plans.

The data for the study were obtained by a variety of means: interviews were conducted with physicians who joined UHC and with those who declined the opportunity to join; interviews were held with families who switched coverage to UHC and with those who remained with BC or GHC; household interviews, calendar/diaries, claim files and medical records supplied information on health services and costs before and after the 1978 open enrollment period for switchers and nonswitchers; telephone interviews and claims files provided data on differential use and costs for two randomly assigned groups of UHC enrollees to assess the effectiveness of the primary care physician (PCP) and the UHC system in controlling access to health care. The major findings of each of the four components of the study are presented below.

PHYSICIAN PARTICIPATION IN UHC

A. Participation

- 83 percent who received the marketing presentation chose to join
- only 2 percent of the joiners dropped out in first two and one half years
- variables significantly related to joining were:
    - . new in practice

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  - greater percentage of uncollectable bills
  - larger volume of self-referred patients
  - affiliated with group practice
  - likely to assess their own practice as taking care of healthier than average mix of patients

- joiners were more likely to agree that:
  - PCP can control use of services
  - UHC can control costs
  - plans like UHC can limit government intervention in health care

- variables not significantly related to joining were:
  - board certification
  - subspecialty
  - age
  - years since graduation from medical school
  - years in practice in county
  - size of group
  - percent primary care patients in practice
  - patient volume
  - referral volume
  - satisfaction with professional income
  - percent of patients with third-party coverage
  - timeliness of third-party reimbursement
  - knowledge of cost of selected procedures
  - fees
  - time spent for selected visits

B. Impact on professional practice of joiners

- the physicians estimated that 86 percent of their UHC patients sought approval before seeking specialist care or using emergency room services

- there was only a small financial impact (because patient panels were small and only 3 percent of the PCPs were on capitation); in 1978, 30 percent had a deficit in their account (median of $105) and 70 percent had a surplus (median $58)

- 38 percent of the physicians said they were more aware of costs since joining UHC

- physicians believe that UHC patients were treated as were other patients, but 22 percent perceived that UHC patients require fewer emergency room visits

- 89 percent of the physicians expressed general satisfaction with UHC
  - physicians were most satisfied with amounts of reimbursement, prepaid comprehensive coverage for patients, and coordinating role of PCP

- but the physicians were slightly less satisfied with specific plan aspects such as patients' understanding of UHC, paperwork and responsibility of coordinating all care
- least desirable feature was financial risk sharing

Discussion

The first major conclusion from this component of the study is that widespread participation by PCPs in an insurance company sponsored plan which puts them financially at risk is achievable. It should be noted, however, that the risk was modest. The decision to join seemed to be as attractive to physicians in shortage areas such as rural California and Bellingham, Washington as it was in urban areas such as Seattle and Spokane. It is not surprising that physicians new in practice, those who are members of groups and those who are doing more primary care work were more willing to join than others. It seems reasonable that the most common reason for joining was the threat of losing existing patients who might sign up in this system and leave the physician's practice.

SAFECO was careful in its initial marketing to make the plan as attractive as possible to private physicians. The fee-for-service reimbursement system was retained until panel sizes grew to more than 200 patients. The risk sharing for total health care costs was kept small so that no physician would end up with less than 85 percent of his or her billed charges. While this portion was less than most PCPs could expect from BC, it represented as much if not more than they were getting from many other insurance plans in the area. In addition no attempt was made during the study period to change referral patterns or reduce hospital or office services through utilization review or preferred provider arrangements. PCPs were allowed to submit their usual charge and 95 percent of it was paid without the imposition of a fee schedule. The general concept promoted was that if paid well and given responsibility as well as a small financial incentive to coordinate the specialist and hospital costs, the PCP would create a more cost-effective system than currently existed. It was clear that the challenge itself attracted some PCPs into the plan as did the idea that they were now in the driver's seat controlling access to the entire system instead of playing second fiddle to specialists regarding their reputations, skills and reimbursement level.

We were not able to assess the effect of practice penetration on use, costs or professional performance in general. At the time of the study, which averaged two and one half years after the physician had joined, there was an average of only 25 patients per panel.

From this survey one is left with the impression that some features of the plan were working. Patients seemed to be going through PCPs and not self-referring to emergency rooms or specialists. The physicians were seeing and reviewing bills and becoming more aware of medical care costs.

The primary goal of the plan was to influence the PCPs to start using a more cost-effective approach to their UHC patients. The first necessary condition for treating these patients with more cost-effective patterns of care is knowing that they are UHC enrollees; four of five UHC physicians were aware of their patients' UHC coverage. Then, PCPs were to employ less costly approaches to health care: substitute short-stay surgery and generic drugs for their more expensive alternatives; use more clinical judgment and fewer laboratory and radiographic studies; use more second opinions before elective surgery; refer to surgeons who were more conservative about when to do surgery and more efficient in terms of radiologic procedures, laboratory tests and hospitalization when surgery did occur.

Not too surprisingly given the size of the average UHC panel, the PCPs reported that they did not treat their UHC patients any differently than the other 98 percent of their patients. For the same reason, it is also unlikely that physicians changed their whole practices and treated all patients more cost-effectively because of this plan.

Thus one is left with the conclusion that, if physician perceptions are accurate, physician behavior is hardly affected by this risk-sharing plan. If physicians have not changed their behavior then we may attribute any cost savings in this plan to the enrollees and how they assess the system. Thus, it is the system in which each patient must pass a gatekeeper, as best exemplified by the randomized experiment, that changes the access, mix and cost of services. Perhaps any physician-caused cost effectiveness will have to await greater participation by more motivated and involved PCPs who are naturally inclined to be not only gatekeepers but true coordinators, monitoring and policing the specialists, pharmacists and hospitals. In order for this to occur most physicians will need a greater incentive than can occur in a widespread independent practice network, or the network must be organized to promote a systematic interchange between PCP and specialist in order to achieve accountability of both.

CONSUMER CHOICE OF PLAN

A. The decision process

- equal proportions of BC and GHC switchers (64 percent and 66 percent, respectively) reported that the subscriber alone made the decision to change plans

- equal proportions of BC and GHC switchers reported that the subscriber and spouse jointly made the decision to switch plans

- the topic of changing plans was dicussed in most households

- high proportions of switchers in BC and GHC (83 percent and 75 percent, respectively) reported discussing the plans with coworkers at places of employment

- major differences between BC and GHC switchers were in their stated reasons for switching
  - financial incentives were very important to BC switchers
  - accessibility and freedom of choice issues were very important to GHC switchers

- for switchers from both plans, the principal reasons for changing plans were:
  - coverage for preventive health care
  - financial aspects of their prior plan (presence of copayment and deductible features)
  - provider related reasons (presence of a physician in UHC, provider recommendations or desire for a PCP)

B. Factors influencing choice
BC enrollees were three times more likely to switch to UHC than were GHC enrollees (8.3 percent compared to 2.5 percent). Four sets of explanatory variables were used to examine the complex factors influencing choice of plan for each group:

(1) Need for care (family's life stage, mental and physical health status, whether anyone in the family was under active care during the open enrollment period)

- GHC families at a lower-risk life stage were more likely to switch; BC families at a higher-risk life stage were more likely to change plans
- no differences in the decision to switch plans were related to reported physical health status variables
- mental health status was found to be important only for GHC switchers/nonswitchers: families with a mentally healthy adult were more likely to change plans; or conversely, families with a mentally unhealthy adult were more likely not to switch (perhaps related to the possibility that the patient was under psychiatric care at

the time of open enrollment)
- being under care at the time of the decision was significant for BC switchers, with those under care more likely to change plans, but for GHC enrollees this variable had no apparent effect on the decision process
- GHC families with female subscribers were more likely to change plans; BC families with younger subscribers were more likely to switch plans

(2) Access to care (family's relationships with usual source of care and time-based measures of accessibility)

- only 5 percent of BC families and 2 percent of GHC families had no usual source of care for any family member
- all family members had usual sources of care in 86 percent of BC families, and in 93 percent of GHC families
- there were not significant differences in source of care between switchers and nonswitchers in either plan
- BC subscribers who switched were more likely to have had recent use of usual source of care, while GHC subscribers who switched were less likely to have had recent use
- GHC switchers were more likely to have higher dissatisfaction with their usual sources of care; BC switchers differed from nonswitchers only in the level of subscriber's satisfaction
- for BC families, the greater proportion of family members with usual sources of care on the UHC list, the more likely the families switched plans

(3) Financial capability (measures of: income; subscriber's occupation, education, race, age and sex; the extent of other health care coverage in the family)
- BC switchers reported lower income than nonswitchers; no difference appeared in GHC families
- BC female subscribers were more likely to change to UHC; GHC families with younger subscribers were more likely to switch
- in both plans, switchers were more likely to have non-professional, non-managerial occupations than nonswitchers
- BC families who switched were less likely to have other insurance coverage; the reverse held in GHC

(4) Experience and satisfaction with previous plans (measures of exposure to both plans; reports of problems with plan administration or provider; out-of-pocket expenditures and satisfaction with that amount; and the frequency with which a family changed health care plans during the period before the 1978 open enrollment)

- switchers in each plan reported greater prior exposure to the other plan (BC versus GHC) than nonswitchers
- in each plan, the length of exposure to that plan was inversely related to the likelihood of switching plans
- in each plan, switchers reported more problems with providers than nonswitchers
- BC switchers and nonswitchers reported similar out-of-pocket expenditures; although BC switchers reported greater dissatisfaction with these expenditures; GHC switchers reported greater expenditures than nonswitchers
- BC switchers had a greater likelihood of a previous switch within three years than nonswitchers; there was no such difference between GHC switchers and nonswitchers

C. Comprehensive model of choice

A multivariate model of choice was estimated using the ten variables which best represented the four sets of explanatory variables. The model was tested in each plan, thus allowing an assessment of the importance of each variable, holding all others constant.

(1) BC model. Each of the variables entering the model was statistically significant.

- the strongest variable was the proportion of family members with usual sources of care on the UHC list.
- families with younger female subscribers were more likely to switch, as were families with lower per capita incomes.
- the less exposure to the BC plan during the year preswitch, the more likely a family would switch to UHC.
- the longer one worked for the state the more likely the family would switch to the new plan
- those families with a member under care during the decision period were less likely to switch to UHC
- those families reporting dissatisfaction with out-of-pocket expenditures and plan administration were more likely to change to the new plan.
- [This set of variables explained 36.8 percent of the variance in the dependent variables.]

(2) GHC model. A strong access variable explained the greatest relative amount of variance in the dependent variable in the GHC model The less satisfied was the least satisfied family member with a usual provider, the more likely the family switched to UHC.

- families with older subscribers were more likely to switch than remain with GHC
- those with professional or managerial occupation were more likely to remain with GHC
- families with less exposure to the plan but dissatisfied with providers were more likely to change to UHC
- [This set of variables explained 29.7 percent of the variance in the dependent variables.]

D. The Effect of Prior Utilization

The subsequent introduction of the variable "prior utilization" into the analyses did not add to the explanatory power of the model. Nevertheless, prior utilization as measured by total standardized volume was lower for BC and GHC switchers than nonwitchers ($134 versus $167 for BC and $84 versus $143 for GHC). Thus, it can be concluded that evaluation of actual utilization behavior of potential switchers during the six-month period preceeding choice of plan shows no adverse selection into UHC from either BC or GHC

Discussion

As noted in Chapter V, the separate analyses of BC and GHC preclude detailed determination of factors affecting switching plans in general. Interpretation of a pooled analysis would have been complicated by the fact that only one-third as high a proportion of GHC members switched to UHC compared to BC enrollees. Nonetheless, there are certain commonalities that deserve mention. Families with exposure of short duration to their plans, families with female subscribers and families who are dissatisfied with either their usual source of care or some administrative feature of the plan were more likely to change plans during the open enrollment period. Conversely, those who had been enrollees in their plans for longer duration, who had satisfactory relationships with their providers and who in general were satisfied with their plan elected to stay with that plan.

The reasons for change from BC and GHC were at the same time different yet similar. It appeared that the principal motivating factor for BC switchers was the opportunity to maintain or secure a usual source of care at lower out-of-pocket costs and less administrative complexity. In the case of the smaller proportion of switchers from GHC, it appeared that dissatisfaction with the plan, plus the expressed desire to achieve an effective primary care relationship with a provider combined to instigate change to UHC. In this component of the study, there was no evidence of adverse selection in terms of prior utilization, family life stage or health status.

COMPARATIVE UTILIZATION

A. Enrollee characteristics associated with differences in levels of use

The populations of enrollees in each of the three plans, after the 1978 open enrollment, differed in several essential characteristics that are related to high or low use according to earlier research

(1) BC enrollees (highest expected use)

- highest percentage white
- highest percentage 45 years of age or older
- highest percentage high income
- highest percentage beyond college education
- more with days of limited activity
- low propensity to seek care

(2) GHC enrollees (second highest expected use)

- younger subscribers
- highest percentage with children under six years of age
- second highest in education
- highest percentage employed by higher education
- more with emotional problems
- moderate propensity to seek care

(3) UHC (lowest expected use)

- second highest percentage white
- lowest in education
- moderate propensity to seek care

The importance of these enrollee characteristics, which were chosen on a theoretical basis as predictors of use, was confirmed by measuring enrollees use of services before the 1978 open enrollment. BC enrollees had the highest use of services prior to the 1978 enrollment, followed by GHC enrollees, and UHC enrollees had the lowest. In addition, BC enrollees had the highest out-of-pocket expenditures before July 1978.

B. Usual source of care

- BC had the highest percentage with no usual source of care
- BC enrollees with a usual source had that source

for the longest time
- BC usual source was more likely to be an internist, obstetrician/gynecologist or surgeon, than in other plans
- BC enrollees with usual sources had the highest number of visits and highest volume of non-referred visits
- BC enrollees had the longest office waiting time
- GHC enrollees had the highest percentage with family practitioners or general practitioners as their usual source
- GHC enrollees had lowest "ease of access" (in terms of waiting time for an appointment and travel time)
- UHC enrollees had highest "ease of access" (in terms of waiting time for an appointment, travel time and office waiting time)

C. Satisfaction with plan and provider

- BC enrollees were least satisfied with their plan, in general
- BC enrollees were least satisfied with out-of-pocket expenditures
- BC enrollees were more satisfied (than GHC enrollees) with their usual source of care
- GHC enrollees had highest percentage dissatisfied with their usual source
- UHC enrollees were most satisfied with plan
- UHC enrollees were more satisfied (than GHC) with their usual source of care

D. Proportions of enrollees in each plan using services (with

at least 18 months of exposure)
- BC enrollees had significantly lower reimbursement use than the other two plans (perhaps partially an artifact of the deductible)
- Moderate variation in percent of enrollees hospitalized, but not significantly different across plans probably due to small sample size

E. Differences in standardized volume of care

(1) Inpatient care
- GHC had slightly lower (not significantly) admissions and patient days than BC and UHC (excluding outliers)
- in standardized volume, UHC is lowest in inpatient visits and total, medical and laboratory procedures
- in standardized volume, GHC is lowest in surgery and radiology procedures
- in standardized volume, BC is highest for

surgical procedures
- GHC had significantly more obstetric admissions and patient days

(2) Ambulatory care
- UHC and GHC had higher numbers of total visits than BC
- UHC PCP visits were higher than GHC, which was higher than BC
- UHC was lowest in non-physician visits
- in standardized volume, BC and UHC were similar, and higher than GHC
- in visit intensity (standardized volume divided by visits), BC was higher than UHC, which was higher than GHC
- in standardized volume for PCP use, UHC was higher than GHC, which was higher than BC, in total and for each procedure type

F. Differences in total standardized volume

- no significant differences across plans, although BC and UHC were similar, and higher than GHC

G. Standardized volume and out-of-pocket expenditures pre-switch and post-switch

(1) Pre-switch
- switchers in both BC and GHC had lower standardized volume than nonswitchers
- switchers in both plans had similar ambulatory standardized volume and PCP standardized volume

(2) Post-switch
- nonswitchers in each plan decreased their total volume of services, and inpatient and ambulatory care volume
- nonswitchers at BC increased their PCP standardized volume whereas nonswitchers at GHC decreased their PCP volume
- switchers from each plan significantly increased ambulatory care volume and dramatically increased their PCP standardized volume
- GHC switchers increased inpatient use (by 47 percent)
- BC switchers decreased inpatient use (by 16 percent)
- GHC switchers significantly increased total standardized volume (by 58 percent)
- BC switchers increased total standardized volume (by 16 percent)
- BC was highest in out-of-pocket expenditures
- nonswitchers in BC decreased out-of-pocket

expenditures
- nonswitchers in GHC increased out-of-pocket expenditures
- BC switchers decreased out-of-pocket expenditures
- GHC switchers increased out-of-pocket expenditures

H. Multivariate analyses

- inpatient differences are large, but overall plan effect was not significant for inpatient standardized volume because the sample size was not adequate to confirm difference
- plan effect was significant for ambulatory use, with UHC significantly higher than BC or GHC

I. Plan, age and sex interactions

- females had higher numbers of visits, increasing with succeedingly older age groups
- GHC had highest number of visits for children, followed by UHC, then BC
- with increased age, females in all the plans have more visits: older females in UHC had more visits than those in GHC while BC females had the lowest number of visits across all age groups
- males in each plan exhibit similar patterns of visits across age groups; the number of visits is greater in GHC than UHC, which is greater than BC
- ambulatory standardized volume was highest for GHC children, but for succeedingly older age groups the ambulatory standardized volume was lower for GHC than other plans
- GHC had more visits, but lower standardized volume than other plans
- BC had fewer visits (and fewer enrollees making visits) but higher mean standardized volume

J. Partial correlations

(1) The most important variables for ambulatory standardized volume were:
- past health care experience
- health status
- other insurance coverage

(2) The most important variables for inpatient standardized volume were:
- health status
- past health care experience

K. Differences between the plans in predictors of use

In addition to the age, sex and plan interactions noted under I., above, other predictors were found, controlling on age and sex:

- previous use and health status were strong predictors in all three plans
- race appeared to be an important predictor in GHC, with whites having more use than nonwhites
- presence of other insurance was an important predictor in BC and GHC
- family size was found to be important in BC

After controlling for other variables:

- health status had significantly less effect in GHC
- previous health care experience had significantly less effect in GHC than UHC
- no interactions between race and plan were found
- no interactions between family size and plan were found

Discussion

There were large differences in use of inpatient services across plans but these were not statistically significant because the incidence of hospitalization was too low and our sample size too small. Ambulatory care was significantly different across plans. In both UHC and GHC, nearly nine out of ten enrollees received ambulatory care, compared to two-thirds in BC. The services provided were most intensive in BC, followed by UHC, with GHC the least intensive. However, the average annual standardized volume of ambulatory care for users was highest in UHC, followed clearly by BC, with GHC having the lowest mean volume. Thus, it appears that UHC exhibited features from BC and from GHC, with a high number of intensive services, as well as the highest proportion of visits to PCPs.

Prior to changing plans, both the BC and the GHC switchers had lower rates of total and ambulatory care than did their cohorts who elected to remain in their respective plans. However, during the year immediately following the switch, both groups of switchers dramatically increased their use of ambulatory services while their cohorts decreased use. This may be the result of large variation in a relatively small sample or may be real differences which could be explained by a number of alternative hypotheses. Although the specific reasons for switching differed between those coming from BC versus GHC, they can both be characterized as being displeased with some aspect of their plan, and desiring a relationship with a PCP at little or no out-of-pocket expense. It is reasonable, therefore, to expect use to be greater after the switch, although the costs of services were expected to be lower in UHC than BC because of the PCP's role as gatekeeper and because of the risk-sharing arrangement.

The patterns of use were different among the plans for men and women of various ages, but after controlling for these and other variables, there was still a strong plan effect, with both BC and GHC having significantly lower ambulatory costs than UHC. In each of the plans, a similar "model" of variables was found to predict use, with past health care experience, health status and other insurance coverage the most important for predicting ambulatory standardized volume. For predicting inpatient standardized volume, health status and past health care experience were found to be the most important variables.

RANDOMIZED EXPERIMENT OF PHYSICIAN CONTROL OVER USE OF SERVICES

A. Principal findings

- subscribers who switched to UHC during the second open enrollment period (1979) gave reasons for changing plans that were similar to those specified by the 1978 group of switchers (see Chapter V)
- the experimental group (without PCP control) used specialists and emergency rooms significantly more often than the control group (with PCP control), and did so without prior approval from a PCP to a significantly greater extent
- the experimental group was more satisfied with their plan than was the control group
- there was no significant difference between groups in proportions switching out of UHC during the following open enrollment period. Those families who elected not to remain with UHC tended to be less satisfied with the plan and to have had lower in-plan charges; out-of-pocket expenditures were not different for switchers versus nonswitchers
- experimental group charges exceeded those of the control group, but total charges and inpatient charges were not significantly different between the two groups. Ambulatory care charges were significantly higher in the experimental group
- there were no significant differences between the experimental and control groups in measures of inpatient use, but the control group tended to display lower use
- the experimental group had a significantly higher percentage of members who submitted at least one claim
- although the experimental group had a higher percentage of members who had at least one ambulatory visit and slightly more visits per year than did the control group, the differences were not significant

- ambulatory care visits to PCPs per year were the same in the two groups

B. Restricting the analyses to users of care with at least six months of exposure, the following findings emerged:

- total charges and inpatient charges did not differ significantly between the experimental and control groups
- ambulatory care charges were significantly higher for the experimental group and appeared to be related to use of non-PCP physicians
- charges for surgical, radiological and laboratory procedures did not differ between the experimental and control groups, for either PCPs or non-PCPs; medical procedures were significantly higher in the experimental group, but only for PCPs
- although the experimental group had significantly more ambulatory care visits to non-PCPs, those physicians did not order significantly more procedures than did the PCPs. However, the PCPs in the experimental group performed significantly more medical procedures than did PCPs in the control group

C. Multivariate analyses

- in general, the results of the multivariate analyses supported those emanating from the univariate analyses
- the experimental group had higher ambulatory and total use, controlling for other variables
- there was no significant difference in hospital claims, although the experimental group was higher
- when the multivariate analyses were restricted to users only, differences between the experimental and control groups diminished to non-significance, indicating that the major difference between the groups was the propensity of members to use services at all, rather than the costs of services for people who do use service. Thus the plan seems to have an effect on the member rather than on the physician rendering care.

Discussion

There were several limitations to this component of the study, as noted in Chapter VII. The principal limitation is the inability to differentiate the effects of the PCP and those of the UHC system on use and charges for both the experimental and control groups.

Nevertheless, the findings indicate that the experimental group (without PCP control) experienced higher use of services and costs than did the group adhering to the standard UHC plan. The principal difference was in ambulatory care, particularly in the volume of visits, use of specialists and the number of medical procedures administered. Controlling for all major variables simultaneously, initial use of services was higher for experimental group members than control group members. No measurement was executed to determine the appropriateness of use (i.e., underuse or overuse according to clinical standards), and lacking such information we can only conclude that the differential use is attributable to a system effect; the standard UHC model does result in lower use and costs than a plan with exactly the same benefits but without a primary care gatekeeper charged with the responsibility for monitoring the totality of patient care.

FINAL COMMENTS

At the time this study was conceived, early data from UHC's experience in California suggested the PCP network concept would be a potentially viable cost control mechanism, without untoward intrusion into the domain of private practice. Indeed, the highly successful recruitment and retention rates of participating physicians in the plan during the first few years of operation in Washington attest to provider acceptance and expectation of a cost-effective mechanism. However, the participating physicians did not admit to any impact on their practice, or special treatment of UHC patients, although they believed those patients made less use of emergency room care and specialist care without the PCP's permission than did other patients.

We saw that the plan concept was also attractive, in spite of relatively little advanced advertising, to a proportion of state employees who had been enrolled in one of the other plans offered -- BC (8.29 percent) or GHC (2.46 percent). Those subscribers switching to UHC by and large were dissatisfied with some aspect of their former plan, desirous of securing a PCP or maintaining a primary care relationship at lower personal cost. UHC did not appear to experience adverse selection; on the contrary, during the period prior to switching, each group had lower use of services than did their cohorts who elected to stay with their plans. However, we also saw a large increase in the switchers' use of ambulatory care and standardized volume of total care after joining UHC, compared with a drop in volume of services rendered to nonswitchers. In the univariate and multivariate analyses of use, we observed that sometimes UHC resembled BC and sometimes GHC, although overall UHC had the highest use and cost rates. As a portion of use (especially initial contact with a provider) is patient-initiated, the resemblances could be artifacts of conditioned behavior in the previous plan. Or, with greater certainty, these findings could reflect genuine system effects on patient (and then provider) behavior. The findings from the randomized experiment support this conjecture, as do the data emanating from the physician participation component of the study.

Did the UHC plan change physician behavior? Perhaps, initially. Although this study was not designed to evaluate change over time, other studies have demonstrated that if control or incentive mechanisms are instituted but left unattended the odds are that their impact will diminish. Specifically, studies of physician behavior in utilization review programs have demonstrated that the immediate effect (of a higher proportion of appropriate patient care) is followed by a reversion to earlier patterns of practice. This is especially true in cases where no penalty is levied on the physician or the patient. Furthermore, a one year period might be too short to observe the "real" plan effect, especially for a new plan.

There is no doubt that the UHC plan did not contain costs any better than BC or GHC; indeed, costs were highest in UHC. However, the plan did achieve the objective of channeling patients through the PCP. And, the UHC enrollees expressed greater satisfaction with their plan than did enrollees in BC or GHC. In the randomized experiment, we observed the consequences of waiving the requirement that UHC patients had to use the PCP as the exclusive portal of entry into the medical care system. Given the same benefits, the group without the PCP as gatekeeper consumed significantly more services and attendant dollars than did the control group with the standard UHC program. Yet, the multivariate analyses suggested that the system primarily affected patient behavior, rather than physician behavior.

EPILOGUE TO THE HISTORY OF UHC (MARCH 1982)

During 1980 and 1981 several problems with the UHC plan developed. First, enrollment stopped growing. By the end of 1979 there were 20,000 enrollees in Washington State and 15,000 enrollees in California. The maximum number of enrollees peaked at 22,000 in May of 1980. It also peaked at that same time in California with 15,500 enrollees. By year-end 1980 there was a slight fluctuation downward and the average number of enrollees during the entire year was 21,000 for Washington State and 15,000 for California. The primary cause of the limitation on growth was an increase in premiums. During the second half of 1980, a large increase had priced the plan between 10 and 20 percent above the other insurance plans with comparable benefits. This caused employers and employees to doubt whether the plan was actually containing health care costs as UHC claimed.

The second problem that developed was with the claims payment and financial information system of UHC. While a manual claims payment system had served UHC well when it was small, the lag in payment continued to grow as membership increased. Providers became upset with the four-month delay of payment for specialists and hospital bills, even after the PCP had approved and submitted these bills. The lag also delayed management's awareness of the large increases in the costs of these components of medical care. Hospital costs had increased 48 percent between 1978 and 1980; this was due mostly to increased use. Rates increased from 295 days per thousand enrollee years during 1978 to 475 days by early 1980. The costs of specialty care had also increased by 44 percent in the two years. Primary care costs had increased, but only by 31 percent over the same period. Thus, the total cost per enrollee escalated by 41 percent in two years (from $278 per year in 1978 to $393 in 1980).

Because of the manual claims payment system and the four-month lag in claims incurred but not reported, the premiums for UHC lagged behind these cost escalations. Thus in 1980, the year in which SAFECO expected to make a profit from its UHC subsidiary, there were large losses. Compared to 1979 when losses in the growing plan totaled only $500,000, the losses during 1980 were $1.8 million.

The third problem was the source of the other two. The failure to control the costs of health care in the plan made it difficult to continue growing and to manage the claims payment and financial information systems effectively. By the middle of 1980, management was well aware that there were some major flaws in its primary care network concept. They knew that costs to the plan for specialists' and hospital care were beyond the control of PCPs.

During 1980, there was a transition away from the open panel, laissez-faire approach to the PCP network. The realizaion was slowly developing that UHC would have to take some drastic steps to bring specialists' and hospital costs under control. The realization that something had to be done was relatively easy. The decision on what to do took longer.

The reliance upon PCPs to monitor costs, and the minimal review of claims by UHC all changed in 1981. During 1981 there were monthly reviews by UHC managers of the dollar amounts going into and coming out of each participating physician's account. There had been several instances when this kind of "quantity review" brought a physician to the attention of the plan manager because of unusually high total costs for the PCP's services. Two physicians were costing UHC three times the average in the community for their own services because of greater number of services per patient. After discussion with an advisory panel of physicians, UHC put each physician on probation. One changed his mode of delivery and stayed with UHC; the other left UHC after efforts were made to cut back his costs to the average of the other doctors in his area.

The cost of specialists' care was burgeoning. In 1978 the ratio of specialty costs to primary care costs was 1:1. That ratio had grown to 3:1 by July of 1980. The PCP had been expected to channel referrals to the most cost-effective specialist and then to continue monitoring and policing the amount of hospitalization and length of stay occurring to his or her patients while they were in the specialists' domain. By July 1980, it was clear to the managers of UHC that they could not rely on the PCP to perform these important cost control functions.

The important realization that 60 to 75 percent of the hospitalizations were being controlled by referral specialists rather than by PCPs convinced management to go ahead with the effort to involve specialists in UHC. When the PCPs were contacted regarding their presumed obligation to monitor a specialist's care given a UHC enrollee, most stated they never had and would not now like to start policing their specialist colleagues. It became clear to UHC management that they had been relying on PCPs to do more than they were comfortable doing. They now realized that the communication with specialists about cost effectiveness issues would have to be taken over by UHC. They also realized that the PCP was not heavily enough invested in the plan to take an interest in monitoring hospitalization or procedures by specialists. With small numbers of patients and only 10 percent of their fees at risk for those patients, most PCPs were not working to change the efficiency of the delivery system.

Because of the laissez-faire way in which UHC was originally conceived and implemented, the evolution toward hospital utilization review and a direct contract with a specialists panel took months to occur. During late 1980, PCPs were polled regarding which specialists in the community they felt were of the highest quality and most cost-effective. UHC management was still reluctant to begin dictating to PCPs where they could send their referral care. Instead the goal was to create a wide panel of specialists with whom UHC could communicate directly and put on a fee schedule. If it became evident that some PCPs were continuing to use non-cost-effective specialists, then an educational process would be embarked upon in an attempt to change referral patterns to cost-effective specialists.

This was a major change for a company which had not initially wanted to intrude in the medical care delivery system. This preference was exemplified by the fact that the company heretofore had only one physician representative for the 650 PCPs in Washington State. The commitment during late 1980 to hire and train two more physician representatives and to begin contracting with specialists took six months to develop.

Since there were 650 PCPs in two large cities (Seattle and Spokane) and their suburbs, it was necessary to have a specialist panel broad enough to provide geographic access. In August 1980 when the survey of the PCPs in Seattle was completed, it was clear that not all of their recommendations for a specialist panel could be accommodated. Nearly all of the 1,500 specialists in the city had been mentioned at least once among the PCPs' preferences. It was not known how reluctant the PCP would be to change referral patterns to specialists who had been chosen by UHC.

In January 1981 UHC took a very moderate approach to change in Seattle and a more radical approach in Spokane. Because Seattle was so much larger and had almost 500 PCPs, there was no one specialist panel which could serve the entire community of physicians. Instead, five separate geographic areas were outlined and a full panel of specialists was created in each of these five areas. Thus while a given PCP may have been unhappy about the choice of a particular specialist and the exclusion of others in his or her area, he or she usually at least had the option of referring to a specialist on his or her own hospital staff. The specialists in each area were chosen on the basis of recommendations by participating PCPs whose reputation with UHC was the best.

The specialists who were chosen were introduced to the concepts of UHC and asked to comply with criteria for length of stay and outpatient surgery which would lower the current costs of hospital care as well as concurrent utilization review of all hospitalizations in UHC. They also had to accept a fee schedule which was constructed to represent the 75th percentile of all charges in the community. If there was agreement to these stipulations, then a specialist was put on a "preferred panel of specialists" to be used by the PCPs in a given area. The preferred panel was to be used for all elective referrals unless there were extenuating circumstances and then an "outside" referral had to be preauthorized by UHC.

In Spokane the approach was more radical. A narrow panel including only one specialist or small group in each specialty was selected for mandatory referral by the PCPs. These specialists were chosen on the basis of recommendations by PCPs and interviews regarding their preferences for length of stay and hospitalizations by the medical director. Thus in Spokane the network was more controlled with all referral care for the 6,000 enrollees channeled to one specialist in each specialty.

In Spokane the specialists had to agree to obtain authorization from UHC prior to any non-emergent hospital admission and performing any office procedures costing more than $100. This feature was not implemented in Seattle. In Spokane a fee schedule was implemented that was comparable to being reimbursed in the community at large. Specialists were also asked to comply with concurrent utilization review on all hospitalized patients.

While UHC was taking these measures to lower referral and hospital costs, it was also terminating many PCPs from participation in UHC. Here, too, the approaches were different in Seattle and Spokane. The justification for the different approaches was the greater losses by UHC in Spokane. In Seattle an analysis of account balances and a subjective appraisal of motivation to work with UHC to contain costs was performed with all 500 physicians. However, there was no initial termination of physicians based on past performance. Instead, the PCPs were counseled on the need for increased efficiency and referral to the specialist panel was promoted. A probationary period of six months was instituted so that physicians who in the past had large deficits in their accounts had a chance to prove that they were motivated and wanted to stay in the system. Virtually all of the Seattle PCPs were allowed to stay with the new restructured plan for the first six months of 1981.

However, the rules changed. The physician had to accept an increase in risk-sharing (20 percent instead of 10 percent of their fees would be paid back to UHC if there was any deficit in their account during 1981). Physicians were required to cooperate with UHC's concurrent utilization review and to refer to the specialists panel for all elective referrals. These changes were presented to the existing PCP membership during the first three months of 1981. To the surprise of management, only 52 out of the existing 500 PCPs chose to terminate their membership in UHC.

In Spokane, PCPs were approached in a manner distinct from the approach in Seattle. An aggressive selection process trimmed the number of PCPs from 150 to 50, chosen for their past performance, account balances and motivation to work with UHC. The new core group included only family physicians and younger general physicians who practiced in groups of two to five members each. In the restructured UHC, obstetrician/gynecologists and internists were excluded as PCPs and all pediatric care was channeled to one group practice of nine pediatricians. The core group of PCPs was included in the preliminary discussions about creating a specialist panel, and their views and preferences were taken seriously by the management in putting together the specialist panel.

However, even for this core group not all preferences for specialists could be accommodated because the panel was to include only one physician in each specialty. Thus, if they were to stay with UHC, some PCPs had to alter their referral patterns for UHC patients. As in Seattle, they were asked to pre-authorize all non-emergency hospital admissions, to cooperate with concurrent utilization review on all hospitalized patients and accept the increased risk-sharing to 20 percent of their fees for any future deficit in the total account. All but five of the selected 50 core physicians remained with the restructured UHC plan in Spokane. Contracts with the other 100 participating PCPs were terminated with a 30-day notice.

The third approach to controlling costs was the restructuring of benefits to enrollees. Management had concluded that the comprehensive HMO benefit plan had caused excessive utilization by enrollees who were free from any cost sharing at the time the services were delivered. The participating physicians had also convinced UHC management that it was difficult to lower hospital use when the patient had no incentive to choose outpatient surgery or to shorten the length of stay once in the hospital. Thus in April 1981 a "low-option" plan was initiated for large employee groups. The low-option plan included an $80 copayment for each day of hospitalization up to a maximum of seven days per family per calendar year; a $50 copayment for every emergency room visit whether or not it was an emergency; a 50-percent copayment for all outpatient mental health visits; and an increase in the drug copayment from $2 to $4 per prescription. This low-option plan was marketed to the employees of the SAFECO Insurance Company and to Washington State employees. It was hoped that it would attract a mix of enrollees with less need for health care services than was currently attracted by the more comprehensive benefit package. In addition it was hoped that the copayments would have a deterrent effect on an enrollee's use at the time of service. Some savings were projected to accrue because the enrollee assumed some responsibility for payment of services previously paid in full by UHC.

The benefit changes were not well received by enrollees. In the two large employee groups the enrollment decreased 40 percent from the level of the preceding year when the more comprehensive HMO benefit package was offered. It was hoped by UHC that this 40 percent were the expensive members. However, there are no figures on whether the new mix of enrollees represented a less or more costly group.

The last problem which clearly plagued UHC during 1980 was the crisis of confidence in top-level management of the parent SAFECO company, which had been financially supporting UHC through its initial development phases. The parent company was asked in late 1980 to put forth another $1 million to pay for a new financial and claims management system. Because of continuing bleak financial results, no firm commitment was forthcoming. Further, future growth was precluded with an adequate computer system. The SAFECO

Company had slowly come to the conclusion that any profits from this HMO subsidiary were not going to be large enough for them in the near future. The losses including administrative costs during 1980, had run to 120 percent of premiums with a $1.8 million total loss. One year earlier, 1980, had been billed as the turnaround year for UHC in showing a profit to the parent company. The crisis in confidence at top management partially hinged on these dashed expectations but also on the nature of the changes that were taking place in order to restructure UHC and the delivery system. These areas were difficult and sensitive ones where management had no expertise or experience. The initial concepts on which UHC relied were proving inadequate and it was now painfully obvious that a more aggressive policy and intrusion into the medical care delivery system would be necessary if UHC were ever to make a profit.

The HMO benefit package was initially conceived as a supplement. However, when large losses forced increased premiums, it was clear that the HMO product was no longer desirable to many small employers. They were now asking for less expensive health care coverage rather than for increasingly comprehensive benefits.

Thus in December 1980, UHC management was instructed by the parent company to search for a buyer for UHC. The selling price was flexible and frequently stated to be $1 if the right buyer could be found. SAFECO wanted to find a reputable buyer who had the experience and knowledge to operate UHC successfully and was financially sound enough to undertake future liabilities which might be incurred while the plan was being restructured. The search for a buyer continued nationwide for about 12 weeks. Most national health care companies contacted were not interested in considering a takeover of UHC. Of the six who had initially shown interest, most lost it after seeing the financial results of 1980.

Because of the complexities of negotiating with existing UHC management and the SAFECO parent company, only one prospective buyer was found. Providence, a Catholic hospital chain, was extremely interested in taking over UHC and retaining the current managers. Providence had negotiated an offer acceptable to SAFECO and to UHC by August 1981. The transfer appeared to be nearing final approval when the Board of Directors at Providence chose not to support purchase of UHC.

After the withdrawal of Providence in late August, there was a four week search for other interested parties before the management at SAFECO decided that it was in their best interest to cut ongoing losses by closing down UHC rather than continuing the search for prospective buyers. An effort was made by the Woodland Clinic to purchase the California part of UHC from SAFECO. This was an attractive option for both parties since the 55 member multi-specialty group provided care for 10,000 of the 15,000 patients enrolled in California. That group of physicians was interested in taking over UHC and running it as their own prepaid insurance plan for the existing 10,000 enrollees. However, they were not interested in contracting with satellite delivery sites to take care of the other 5,000 enrollees. Because of this difficulty in conjunction with failure to convince SAFECO management that the Woodland Clinic had enough experience, knowledge and financial resources to manage the plan, the sale was not effected. Instead, in early October 1981 the decision was made not only to close down UHC in Washington but also in California and to transfer all enrollees as soon as possible to other insurance plans in each geographic area. This process is nearing completion for Washington State, with only 2,000 enrollees remaining as of February 1982. In California the process is taking longer but will be completed by September 1982. SAFECO has honored all outstanding bills and treated both physicians and enrollees generously in this process.

The former managers of UHC have created their own health management company and are now constructing a "preferred provider network" including specialists and PCPs chosen because of their past cost-effectiveness in the UHC system. This network is being marketed to employers who are self-funding their medical plans and are interested in lowering costs by offering their employees more comprehensive benefits from a limited number of physicians. The new network is a fee-for-service reimbursement system for the doctors, but uses concurrent utilization review of all hospitalizations, a fee schedule for specialists and a preselected group of physicians as a new generation attempt at cost containment.

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EXECUTIVE SUMMARY

CONSUMER CHOICE AND COST CONTAINMENT AN EVALUATION OF SAFECO'S UNITED HEALTHCARE PLAN*

As health care costs continue to rise, various cost control approaches come under close scrutiny. Because physicians direct most medical expenditures by ordering procedures, referring patients to specialists, or admitting patients to hospitals, new health insurance plans have developed that offer physicians financial incentives to control costs. A number of innovative delivery systems have been developed in which physicians are given incentives to provide appropriate high quality services in more cost-effective ways. These plans usually include some form of prospective reimbursement and frequently place providers at risk for providing patient care.

One such innovative plan was United Healthcare, organized in 1974 by the SAFECO Insurance Company. Originally known as Northwest Healthcare and later changed to United Healthcare (UHC), the SAFECO model enlisted primary care physicians as "gatekeepers" to become financial as well as medical managers of their patients' care.

Researchers in the Department of Health Services at the University of Washington (Seattle) had an opportunity to compare the United Healthcare experiment with two other health care plans, Blue Cross of Washington and Alaska (BC) and Group Health Cooperative (GHC). These plans were offered to Washington State employees during 1978-1980, providing a natural setting for evaluation of consumer and physician participation in the plans and the use of health services.

The Health Care Financing Administration (DHHS) funded a study comparing these three health plans to address a number of issues related to multiple choice of plans and differential use of services associated with health care organized and financed in different ways. The components of this study included: (1) physician participation in United Healthcare; (2) employee choice of plan; (3) comparative use of services across the three health plans; and (4) assessment of primary care physician control of use and charges.

The data for the study were obtained by a variety of means: interviews were conducted with the physicians who joined UHC and with those who declined the opportunity to join; interviews were held with families who switched coverage to UHC and with samples of those families who remained with BC or GHC; household interviews, calendar/diaries, claims files, and medical records supplied information on health services use and charges before and after the 1978 open enrollment period for switchers and non- switchers; telephone interviews and claims files provided data on differential use and cost in 1979-1980 for two randomly assigned groups of UHC enrollees to assess the effectiveness of the primary care physician (PCP) and the UHC system in controlling access to health care.

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Description of Health Care Plans

The three plans offered to Washington State employees residing in the Seattle metropolian area provided similar comprehensive health care benefits. Premiums for state employees and all family members were paid by the employer. However, the plans differed in organizational and financial structure, and potential out-of- pocket costs for the enrollees. These differences will be seen in the following plan descriptions.

United Healthcare operated from 1974 to 1982 in Northern California, Utah, and Washington and at its height had 40,000 members and 900 participating physicians. In 1982, subsequent to the completion of data collection for this study, the plan was terminated after recording large losses. United Healthcare was organized as a primary care network model to encourage PCPs in private practice to control the use and cost of services for their patients. The plan expected PCPs to act as gatekeepers and attempted to change the financial practice arrangement of the PCPs but not their practice setting. Primary care physicians included family and general practitioners, pediatricians, internists, and a few obstetricians/gynecologists.

Although the original intention was to place primary care physicians on capitation, almost all were reimbursed at 95 percent of their charges. An account was established for each PCP based on the age and sex of his or her panel of enrollees. These funds were then allocated to cover hospitalization, drugs, specialty, ancillary, and other referral costs. If an enrollee received care from a specialist without approval from the primary care physician, UHC would not pay the claim and the enrollee was responsible for payment. At the end of the year the PCP shared with United Healthcare any deficit or surplus remaining in the account. If at the end of the year, overall costs for patient care exceeded the total amount budgeted, the primary care physician had to pay back what was over-spent, up to an amount equal to five percent of the capitated rate or ten percent of the fee-for-service allotment. Any unused reserves were split 50-50 between the PCP and SAFECO.

Consumer marketing in an area did not begin until 60 percent of the PCPs in that area had agreed to participate in the UHC plan. United Healthcare believed it would be easier to attract customers if enrollees had the opportunity to retain their regular doctor and facilities. Furthermore, enrollees did not have to submit claims because physicians billed United Healthcare directly. Until 1981, UHC marketed only one benefit package -- a standardized comprehensive plan with no deductible or coinsurance, a $25 copayment for a general physical exam and $2 for each prescription. Premiums were competitive with other comprehensive prepaid group plans.

The second plan, included for comparison with United Healthcare, was Blue Cross of Washington and Alaska. This was a comprehensive insurance plan which covered hospital and ambulatory care including prescription drugs. There was a $50 deductible per individual ($150 per family maximum annual deductible), and ten percent coinsurance up to a maximum of $1950 per family. Copayments and limits for maternity and mental health existed as with the other plans. Blue Cross reimbursed physicians on a UCR fee-for-service basis, and enrollees could obtain services from virtually any provider in the community.

The third plan studied was Group Health Cooperative of Puget Sound, a large and well established, consumer-owned, prepaid, closed-panel health maintenance organization. GHC had no deductible and no copayment provisions except on drugs, maternity, and mental health visits. Enrollees were required to use GHC facilities and GHC physicians, who were salaried.

Results

The major findings of each of the four components of the study are presented below.

Physician Participation in United Healthcare. The key to success for any independent practice association lies in its ability to attract high quality and cost-effective community physicians. This component of the study described the type of physicians who joined UHC and compared them to those who did not join. In addition, the study attempted to probe physician perceptions of whether the important features of the plan were working properly and whether the plan had changed the behavior of participating physicians. Physicians in Seattle, Spokane, and Bellingham, Washington and in Yuba County, California who had been given a UHC marketing presentation and an opportunity to participate in the plan were interviewed by telephone.

Five out of six physicians (83 percent) who were given a presentation by UHC decided to join the plan. The decision to join seemed to be as common in physician shortage areas, such as rural California and Bellingham, Washington, as in urban Seattle and Spokane. Younger physicians and those who were members of group practices and providing more primary care were more likely to join than others. The most common reason reported for joining was fear of losing patients to the new plan if the physician did not join.

The primary goal of the plan was to influence PCPs to begin using a more cost-effective approach to patient care. The average number of patients in each physician's panel, however, was only 25 in 1978. Thus, it is unlikely that physicians would begin looking for more cost-effective ways to deliver care, because of their small-scale involvement in this plan. However, it was the PCP's perception that UHC patients were incurring significantly fewer emergency room visits, elective surgery, laboratory tests, and radiographs. In terms of physicians' financial risk, few physicians had large losses. But with small numbers in each panel, it was usually uncontrollable events rather than clinical practice styles that determined the outcome of these individual accounts. Therefore, one or two sick patients who needed substantial care determined the deficit or surplus remaining in the account at the end of the year. In addition, physicians reported that they believed it was often inappropriate for them to approve or disapprove specialist services.

Physician's satisfaction with the plan was very high, with nine out of ten physicians expressing overall satisfaction. These figures fit the anecdotal responses of most physicians that indicated the plan allowed them to practice with no interference but resulted in a higher reimbursement rate.

Employee Choice of Plan. This component of the study focused on the success of UHC in attracting enrollees, the characteristics of those families switching to UHC, and evidence of adverse or favorable selection. Of Blue Cross enrollees, 8.3 percent switched to UHC in the 1978 open enrollment period, whereas only 2.5 percent of GHC enrollees switched to UHC during the same perid.

Various factors influenced choice of plan for BC versus GHC families. In general, no "need" variables were important in influencing the switch from either GHC or BC to UHC. However, perceived access to health services was important in switching from BC. The strongest predictor of switching to UHC for BC enrollees was if the enrollee's usual source of care was on the UHC list of participating PCPs. Group Health Cooperative enrollees were more likely to switch to UHC if they were dissatisfied with their usual source of care. Financing variables were important for both BC enrollees (people with lower income were more likely to switch to UHC) and GHC enrollees (people with lower occupational status were more likely to switch to UHC). BC and GHC enrollees with less time on the plans were more likely to switch to UHC.

In summary, accessibility of care considerations were more important than measures of health status or prior use of services in predicting choice of health care plan for both Blue Cross and Group Health Cooperative families. For BC switchers, changing to UHC was seen as an opportunity to maintain the family's relationship with their usual provider without the expensive deductibles and copayments. For GHC switchers, the new plan provided the opportunity for family members to leave unsatisfactory relationships with providers and seek new relationships with no monetary penalty.

Comparative Use of Services Across Plans. It was expected that UHC would attract families who tend to use more services because it was a new plan with freedom of choice of PCP and comprehensive coverage with low out of pocket costs. However, there is no evidence from the variables examined that UHC attracted higher risk enrollees. In fact, based on prior use of services, health status, and sociodemographic variables related to use of services, one might expect if anything that BC and GHC enrollees would use more services than UHC enrollees.

This component of the study examined the proportion of individuals using services and the number and intensity of services delivered to enrollees. UHC and GHC both had a high proportion of enrollees using any covered service during the study period (88 percent versus 90 percent); whereas only 70 percent of BC subscribers used any services.

All three plans had similar use of hospitals, but there were significant differences in ambulatory use. United Healthcare enrollees had more ambulatory physician visits per enrollee per year (3.4) than enrollees in BC (2.1) or GHC (2.8). UHC enrollees also had a higher number of visits to PCPs and the PCPs did more procedures or more complex procedures per visit than in other plans. UHC had a volume or intensity of services per user per year that resembled BC for each type of procedure.

In summary, inpatient standardized volume was similar across plans. The important plan differences are reflected in outpatient use: BC appeared to control outpatient use by limiting the percent of enrollees using services, although it provided a relatively high level of intensity of care to users; GHC had a high percentage of enrollees using services, but limited the intensity of care; and UHC had both a high percentage of enrollees using services and provided care at a high level of intensity.

Assessment of Primary Care Physician Control Over the Use of Services. In 1979, a controlled randomized trial was conducted using 2,827 individuals in 1,113 families to study the effectiveness of primary care physician control of services. Families who agreed to participate (91 percent of those asked) were randomly assigned to one of two UHC plans: the standard United Healthcare plan with primary care physician control; or an alternate UHC insurance plan with no primary care physician control. Individuals in the plan with no PCP control received the same comprehensive benefit package but were not required to choose a PCP or to obtain the approval of the PCP for emergency visits, specialist care, or hospitalizations. Enrollees in both plans were followed for 12 months and outcome data were collected on the use of health services and charges from UHC claims files and from an end-of-study interview.

The random assignment resulted in two similar groups as measured by a number of enrollee characteristics. Inpatient use and charges were similar for the two plans. However, outpatient use and charges were significantly lower in the plan with primary care physician control. This lower outpatient use in the plan with PCP control was due to a lower percentage of enrollees who used services and fewer visits to specialists. Percent of enrollees using services reflects initial use of the plan which is under the enrollees' control and can be viewed as a plan or system effect or as an indirect effect of PCP control; whereas, the lower number of visits to specialists can be viewed as a more direct effect of PCP control.

Therefore, the plan with PCP control affected the behavior of both enrollees and PCPs. Such a plan decreases enrollees' perceived access to PCPs, thus limiting the initial use of services, and requires PCPs to act as gatekeepers, thus decreasing the use of specialist visits. Although the standard UHC plan led to reduced outpatient services when compared with the plan with no PCP control, we must interpret these findings cautiously in view of the results obtained from the comparative use of services component which compared UHC with BC and GHC. Comparative utilization results showed that the standard UHC plan with PCP control did not have significantly lower use than the other two plans. This may be true because the plan with no PCP control in this randomized trial had fewer constraints than the other insurance plans offered to employees. Almost all insurance plans control access to care in some way or have system controls on utilization.

Conclusions

United Healthcare represented a plan of the type often proposed by advocates in the business community, the federal government, and the health care industry. It was organized by private industry with no government support for its development. Second, it attempted to contain costs by arranging for primary care physicians in the community to share in the financial risk of caring for their patients. Third, it increased competition in health care as it was introduced into areas with strong plans, including closed-panel health maintenance organizations and more conventional health insurance programs. Fourth, UHC required low capital expenditures because it used existing health care facilities in the community.

The plan was successful in marketing to physicians with most PCPs in an area joining the plan. In addition, the plan was successful in attracting enrollees who by the usual measures were not at particularly high risk for using services.

However, this evaluation showed that UHC did not provide adequate incentives for physicians to control costs and did not employ other types of system controls. As a result, the plan did not adequately control use or costs relative to other insurance plans. Inpatient use was similar but UHC enrollees had outpatient volume similar to BC enrollees and greater than GHC. It appears that UHC did not control the use of services by PCPs acting as gatekeepers, but instead it may have been the effect of the closed system that limited the enrollees' perceived access to care. It is likely that any change in physician cost-effectiveness requires a physician to be more motivated and involved as a monitor for specialists, pharmacists, and hospitals. In order for this to occur, most physicians will require a greater stake in the system than was theirs in UHC. Furthermore, primary care physician control may not be sufficient to control costs effectively and may need to be used in conjunction with enrollee cost-sharing, specialist panels, and system controls such as utilization review and pre-authorization for major procedures.

NOTE

Appendices referenced in this report may be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22151 (telephone: 703-487-4650). Volume II PB82 264920 contains detailed descriptions of the methods and analyses. Volume III PB82-264938 contains the data collection instruments used in this study.

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